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How Do Bed Bugs and Other Insects Breathe...

The insect world is a bizarre place. Insects have strange body parts that humans lack, like extra pairs of legs and eyes. Pretty much everything about insects is weird and different from that of humans, including the way they breathe.

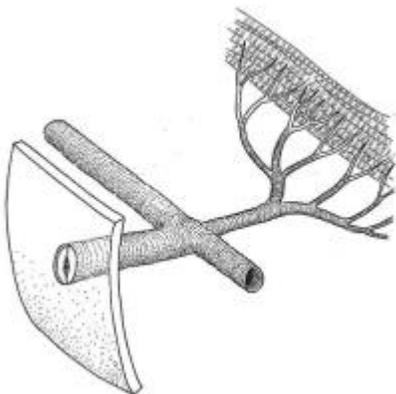
Humans breathe by taking in air through the lungs. Muscles in our diaphragm help us to do this by expanding and contracting like billows. From the lungs, the air is circulated through the rest of our bodies in the blood. Blood carries oxygen needed for the chemical process of turning food into energy, to each of our individual cells.

The muscles and cells of insects need oxygen too. But, insects don't have lungs and their blood doesn't carry oxygen. Instead, insects take in air through tiny holes lining the undersides of their bodies called spiracles. These spiracles open when the insect expands the muscles in its abdomen and close when the insect contracts its abdominal muscles.

The air is taken in through the spiracles and then travels through trachea, small tubes that lead to the different areas of the insect's body. The air reaches the end of the trachea and by the process of diffusion, the air is absorbed into special cells that let the air diffuse into the other cells in the insect's body. Insects can expand or contract their abdominal muscles to help push air in and out of the spiracles, but they rely on the process of diffusion for the air to reach individual cells.



Most insects can survive underwater for long periods by closing their spiracles and slowing down their metabolism, but aquatic insects have made some special adaptations to be able to survive underwater. Some aquatic insects have gills that trap oxygen in the water and transport it into the trachea. The riffle beetle uses special hairs on the underside of its body to trap air which it can use to breathe while underwater.



Spiracle

The diving beetle uses a similar method of storing air underwater but uses its wings to make a bubble of air which it uses like a scuba tank. The bubble actually works better than a tank, however, because it allows more oxygen to enter it while underwater through the process of diffusion. The oxygen in the water gets absorbed into the bubble, allowing the beetle to stay underwater for up to thirty-six hours.

Mosquito larvae live underwater too. They are usually upside down in the water with a special tube that rises to the surface like a snorkel. The tube has hairs around the open that keep water out. Some species of mosquito larvae take advantage of supplies of oxygen some aquatic plants store in underwater called vacuoles.

The oxygen is a waste product of their respiratory cycle, but it helps them to float. The mosquito larvae use their breathing tubes to puncture the vacuoles and breathe in the oxygen. Talk about adapting to your environment!