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Biodiversity is life



Biodiversity is our life

Human Health and Biodiversity

You rely on biodiversity to stay healthy. Healthy ecosystems prevent human illness by providing food and clean water, and by breaking down and recycling wastes. In addition, many plants and other organisms are useful in medical research or contain substances used as medicines.

In the venom of one cone snail, for example, a new painkiller was found that is far stronger than morphine, but unlike morphine, continues to be effective with chronic use. Paclitaxel, used in treating breast, ovarian, and other cancers, comes from the Pacific Yew tree. Polar bears may hold cures for osteoporosis, kidney failure, and type II diabetes. If species such as these disappear, they will take their secrets with them.

Clearing new land, especially in the tropics, for agriculture or settlement may exact a serious toll on human health. It brings people into closer contact with wildlife that may transmit their diseases, and it may reduce populations of predators that hold disease-carrying organisms in check.

HIV entered humans via infected primates, which remain essential models for studying* the disease. Many primate species are endangered because of habitat loss, the bushmeat trade, and other causes. Losing them will decrease our chances of finding a cure for AIDS.

Influenza viruses from pigs, birds and humans routinely swap genetic material. It is the exchange of genes between species that triggers pandemics such as H1N1. As habitat shrinks for wild species, they are more likely to come into contact with each other, domesticated animals, and people, possibly increasing the chance that infections may spread between them and us.

*The use of living organisms in biomedical research contributes greatly to human wellbeing. It goes without saying, that research animals should be treated humanely and with respect.



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Fast Facts

- ▶ The first records of traditional medicines, such as the oils of cedar, cypress, licorice, myrrh and poppy, date back to 2600 B.C., and they're still being used today.
- ▶ Antibiotics now come almost exclusively from microbes, with the first being penicillin, isolated from the *Penicillium* fungus.
- ▶ Microbes hold vast medicinal potential, yet most are unknown, though they are extremely abundant. In one millilitre of seawater there may be 1 million bacteria; in soil more than 100 million per gram.
- ▶ Artemisinin, from the sweet wormwood plant is one of the most effective anti-malarial drugs used today.
- ▶ Sharks contain substances that may be able to treat macular degeneration, the leading cause of blindness in the Western world. Sharks also help us understand how our kidneys and immune systems work.
- ▶ Amphibians produce unique anti-microbial compounds that may lead to our using more effective antibiotic treatments without the development of antibiotic resistance.
- ▶ Worldwide, there are more than 150 million cases of type 2 diabetes, most of which are related to obesity. These numbers are growing rapidly. The study of denning bears could lead to new, more effective treatments for this dreaded disease.
- ▶ Schistosomiasis is a parasitic disease afflicting over 200 million people annually. It's carried by freshwater snails. Overfishing may reduce populations of snail predators, resulting in a greater risk of human schistosomiasis.
- ▶ Deforestation in the tropics tends to favour snails that carry schistosomiasis and mosquitoes that carry malaria.

Learn More

The Center for Health and the Global Environment at Harvard Medical School

▶ chge.med.harvard.edu/programs/bio/index.html

The Natural Products Branch of the National Cancer Institute (U.S.)

▶ dtp.nci.nih.gov/branches/npb/index.html

The Consortium for Conservation Medicine ▶ www.conservationmedicine.org/index.htm

This fact sheet is based on the book *Sustaining Life: How Human Health Depends on Biodiversity* (E. Chivian and A. Bernstein, editors), Oxford University Press, New York, NY 2008.

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