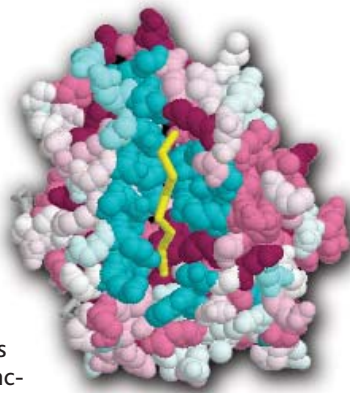


TOOLS

Tracking Protein Evolution

Some parts of a protein can evolve speedily, whereas other sections remain the same over millions of years. How fast a stretch of amino acids changes can provide insight into its function and the workings of the entire protein. ConSurf, a new search tool crafted by researchers in Israel, Japan, and the United States, lets you hunt down variable and conserved regions within these molecules. Pick your favorite protein, and ConSurf scours the Protein Data Bank for similar sequences, then computes the rate of evolution for different amino acids. In this ConSurf map of the major histocompatibility protein I (above), which helps the immune system identify pathogens, turquoise indicates the most fickle regions and burgundy marks the most stable.

consurf.tau.ac.il



DATABASE

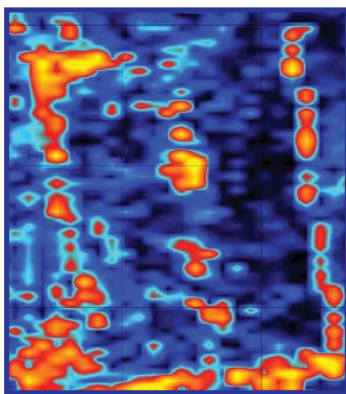
What Lies Beneath

This radar image (below) shows the buried foundation of a razed Civil War-era church in Mount Comfort, Arkansas. Ground-penetrating radar is one of a slew of techniques that enable archaeologists to peer beneath the surface before they dig, pinpointing finds from single artifacts to entire villages. Persuading researchers to try these revealing but underused methods is the aim of the North American Database of Archaeological Geophysics, headed by archaeologist Kenneth Kvamme of the University of Arkansas, Fayetteville.

A good place to start is the educational materials section, which introduces different techniques. For example, because packed soil doesn't conduct electricity as well as damp, loose soil, gauging the electrical resistivity at a site can uncover hidden paths and trenches. Magnetic measurements can reveal whether topsoil has been shifted, indicating past digging and construction. You can peruse the projects database that summarizes geophysical readings from more than 100 sites in North and

Central America—from Indian dwellings in North Dakota to the pyramid-filled ancient city of Teotihuacan in Mexico. There's also a gallery of images from the sites and a virtual Rolodex of companies, consultants, researchers, and labs that practice the methods.

www.cast.uark.edu/nadag



EDUCATION

Codependent Creatures

When it emerges from hiding, the bobtailed squid (below) will quickly become fish food without help from some bright bugs. Luminous bacteria, cousins of the gut-wrenching microbe that causes cholera, bed down inside the mollusk's body. On moonlit nights, their glow helps obscure the squid's silhouette as it swims near the surface.

Close associations, or symbioses, between animals and bacteria are common, and this site by microbiologist Joerg Graf of the University of Connecticut, Storrs, explores four examples, including the bacterial denizens of the leech's gut and the bugs that feed aphids their essential amino acids. The descriptions are full of fascinating details about these relationships. A hatchling squid, for example, nets its stock of bacteria from seawater using mucuslike goop. This partnership also has its tensions: The squid feeds its tenants lavishly while trying to slay them with corrosive chemicals, which the bugs counter with neutralizing compounds. Each account features a

bibliography and links to labs studying the symbiosis.

www.sp.uconn.edu/~mcbstaff/graf/Sym.html



RESOURCES

Clearing the Air on Global Warming

Dismayed by tepid Web sites on heat-trapping greenhouse gases, Dave Reay, an environmental scientist at the University of Edinburgh, U.K., decided to amass his own comprehensive and up-to-date file of information. GreenHouse Gas Online should be enlightening for researchers, students, and policy-makers debating how to cut emissions of carbon dioxide, the main greenhouse gas. Scientists can keep abreast of the latest findings with a listing of new papers gleaned from more than 100 journals. For teachers and students, Reay has written succinct backgrounders on topics such as the possible effects of global warming; sources of greenhouse gases; and carbon dioxide sinks, such as plants and the ocean, that store the molecule. The site also links to news stories on pollution and climate change, such as the recent discovery of a "brown cloud" of airborne gunk hovering over Asia.

www.ghgonline.org

Send site suggestions to netwatch@aaas.org. Archive: www.sciencemag.org/netwatch