

Lightning provides vital spark for evolution

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Bolts of lightning that strike the ground may help bacteria adapt and evolve. Experiments suggest that electrical currents help soil bacteria exchange DNA.



Photo: Image Bank

Scientists commonly use electricity to increase the permeability of bacterial cell membranes, making it easier to insert DNA. Now Sandrine Demanèche's team at the University of Lyon has provided the first evidence that nature may have been wise to this trick all along.

The researchers seeded soil samples with the *E. coli* bacterium, as well as fragments of DNA containing genes for antibiotic resistance. They zapped the soil with a simulated lightning strike, and found that many of the bacteria had acquired the resistance genes.

Bacteria are already known to take up and use foreign DNA released into the environment when other organisms die. Scientists knew this "horizontal gene transfer" occurs naturally in soil, but thought it was relatively rare. However, recent genomic research indicates that this gene take-up is widespread and has played a major role in the evolution of the bacterial genome.

"This result might help explain the discrepancy between the very low observed rates of gene transfer and the apparently wide distribution of DNA sequences among bacteria," says team member Timothy Vogel.

Lightning may seem relatively rare, but there are about a hundred flashes a second around the planet. Ground strikes almost always create currents in the surrounding soil similar to those from the simulated bolts, Vogel says.

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