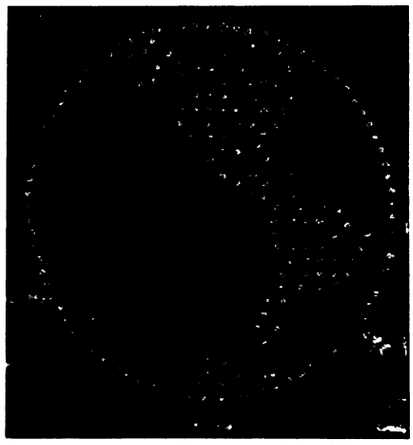
strong electric field can ionize and eject atoms from a surface, but no one had tried this approach with a solid STM tip. The IBM team chose gold as the tip material because it holds its atoms loosely and does not react in air, disrupting the STM.

Rugar's idea worked. In the Nov. 5 PHYSICAL REVIEW LETTERS, he and his colleagues report that short bursts of voltage applied to the gold tip produced surface mounds typically measuring 100 to 200 angstroms in diameter and 20 to 30 angstroms high, each containing several thousand atoms. The linear dimensions of today's computer-chip features are about 100 times larger.

Other researchers have "written" characters of the same size or smaller using different methods and more complicated setups, Mamin notes. Last April, for instance, another IBM team reported it had written "IBM" by pushing individual xenon atoms into place with an STM, but this required supercold temperatures and a vacuum. "We can operate in room temperature and in air," Mamin says.

The new method works fast, depositing a single mound in a few hundred nanoseconds or less and creating a grid of more than 100 mounds in just a few minutes. The speed is limited only by the time it takes to move the tip between locations, Mamin says.



IBM

Arguably the smallest map of the Western Hemisphere, the actual diameter of this image – greatly enlarged here – measures about one-fiftieth that of a human hair. Each dot is a mound of gold containing thousands of atoms.

"We were also surprised how reliably it worked," Rugar adds. "We thought that after a few tries the tip would be blunted so that it wouldn't be able to emit well." Instead, they found that many of the tips could make thousands of dots.

The researchers now plan to try different materials, including a silicon surface, and will attempt to increase the technique's speed. *– R.N. Langreth*

Malaria drugs may boost viral virility

Mouse studies suggest that five of the most commonly used antimalaria drugs may make individuals especially susceptible to viral diseases, including AIDS. If confirmed in humans, this could portend a no-win predicament for the millions of Africans who live virtually surrounded by both the AIDS virus and the deadly malaria-causing protozoan *Plasmodium falciparum*.

Radha K. Maheshwari and his colleagues at the Uniformed Services University of Health Sciences in Bethesda, Md., gave healthy mice one of five different antimalaria drugs and then injected the animals with either of two tropical viruses – Semliki Forest virus or encephalomyocarditis virus. At blood concentrations equivalent to therapeutic levels in humans, the antimalaria drugs significantly enhanced viral replication, leading to more rapid onset of disease and higher death rates in the treated mice compared with untreated mice challenged with the same viruses.

The researchers say their data are consistent with *in vitro* experiments by others suggesting that antimalaria drugs may enhance the activity of the AIDS virus and Epstein-Barr virus, which has been associated with a cancer called Burkitt's lymphoma. They say their experiments – the first to test the phenomenon *in vivo* – "suggest that the widespread use of antimalarials in malaria-endemic areas may predispose the population to significant viral infections, including AIDS." The team presented its data in New Orleans last week at the annual meeting of the American Society of Tropical Medicine and Hygiene.

Scientists know that chloroquine, the most commonly prescribed antimalaria drug, suppresses the immune system, says William K. Milhous of the Walter Reed Army Institute of Research in Washington, D.C. However, he adds, it's not obvious why other, chemically unrelated antimalarials would also do so.

In the mouse experiments, all five drugs suppressed the disease-fighting "natural killer cells" and apparently blocked the action of interferon, an immune-enhancing chemical secreted by several types of white blood cells. Noting that physicians in Africa often prescribe synthetic interferon to help ward off infections, the researchers warn that antimalaria drugs might render that treatment useless.

Milhous says scientists will have to perform similar studies in primates to help determine whether the new findings apply to humans. *– R. Weiss*

Fossil find creates ancient ape puzzle

The first discovery of substantial limb remains from an ancient ape known as *Sivapithecus*, unearthed from 9- to 11-million-year-old sediments in Pakistan, raises perplexing questions about the creature's evolutionary standing.

Although previously excavated skull fragments indicated *Sivapithecus* was an early cousin of the orangutan, two new upper-arm bones more closely resemble those of chimpanzees, gorillas and many monkeys, assert anthropologist David Pilbeam of Harvard University and his colleagues. The shape of these nearly complete bones suggests *Sivapithecus* principally walked on all fours rather than spending much of its time climbing in trees and hanging from branches, the scientists report in the Nov. 15 NATURE.

Two possible evolutionary scenarios now exist for *Sivapithecus*, they point out. One argument supports an ancestral link between the ancient Asian ape and modern orangutans based on shared features of the face, nose and palate, while maintaining that limb similarities between *Sivapithecus* and African apes represent independent developments. The other proposes that *Sivapithecus* was not clearly related to any living ape and that its facial resemblance to orangutans fails to indicate a common ancestry.

Individual variation in the shape and size of bones among ancient and modern apes belonging to the same species creates serious problems for anthropologists attempting to reconstruct evolutionary relationships (SN: 8/18/90, p.106). Thus, Pilbeam and his co-workers maintain, further fossil discoveries of *Sivapithecus* probably will not reveal its definitive ancestral standing.

The two arm bones possess curved shafts similar to those of two groups of ancient African apes as well as most modern, knuckle-walking monkeys, the researchers note, whereas tree-dwelling apes such as the modern orangutan have straight upper-arm bones. The elbow joints resemble those of modern apes, suggesting that specialized anatomical features for climbing and suspension also developed in animals that spent most of their time on the ground, the anthropologists contend.

They add that previous fossil finds indicate *Sivapithecus* also shared with living African apes some important hand and foot features that aid in four-legged walking.

Sivapithecus dates to between approximately 13 million and 7 million years ago. Its remains have turned up in Greece, Turkey, India and Pakistan. Once considered a precursor of humans, it was first aligned with orangutans about 10 years ago. *– B. Bower*