

New technique to decode genome

In the United States, sequencing the human genome took a government consortium more than a decade and Celera, a biotechnology company, nine months – even with help in the form of information gleaned from the public project. In a new development, scientists report that the same feat can be achieved within a matter of hours.

Mr. Daniel Branton, Ms. Jene Golovchenko and Mr. David Deamer intend to build a detector that will read the sequence of bases in a single strand of DNA as it squeezes through a tiny hole. By measuring slight fluctuations of electrical current at this “nanopore”, researchers hope to be able to discern what bases are shuttling through it. This new approach is similar to the operation of an ordinary cell membrane.

Using a lipid bi-layer, researchers divided a dish into two and placed a long, single strand of nucleotides (which, in nature, carries a negative charge) into one half of the dish. The team then employed an old foe, a bacterium called *Staphylococcus aureus*, to make a single channel, or nanopore, in the membrane. The micro-organism produces a protein that kills cells by puncturing their membranes. Though toxic to humans, the *S. aureus* protein was ideally suited for piercing a minute hole in the fat barrier. Next, a voltage bias was created across the artificial membrane, causing the negatively charged nucleotide chain to push its way through the pore towards the positive side of the dish. As each nucleotide flows through the nanopore, it produces a distinct current. Researchers hope that eventually these electrical signatures can be read off, one by one, in real time as if the bases were flashing identity cards while passing through a turnstile. (The Economist Technology Quarterly, 23 June 2001)