

GNN - News Article - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Home Search Favorites Media

Address http://gnn.tigr.org/articles/03_03/fuels.shtml Go Links

GNN

Genome News Network

THE CENTER FOR THE
ADVANCEMENT OF GENOMICS

THE CENTER ON THE A. AMERICAN GENOMICS

CC PD LA VA UT FS MICH

CC PD LA YORCKENUT FS CL

CC SA THE VA UT GENOMICS

GNN Home | About GNN | Subscribe | Contact Us | Archives |

DNA fuels new world record

By [Kate Dalke](#)

March 7, 2003

Using DNA, computer scientists in Israel have created the world's smallest biological computing device. And they have a certificate from the *Guinness Book of World Records* to prove it.

The devices are made of enzymes and DNA in salt water. They are only a few nanometers long, a milliliter of salt water can contain 3,000 trillion devices.

Internet

Green and blue DNA strand holds data, while red and purple DNA stand encodes program rules. The colored ribbon enzyme breaks apart the double stranded DNA to provide fuel for the calculations. Bottom part of image depicts calculations.
©2003 National Academy of Sciences, U.S.A.

Someday, these devices could be used to create computers that make and deliver drugs inside the human body—what the researchers call "doctors in a cell." The new devices are still basic, and it may be decades before the research can be applied to real-world medicine or technology.

"Even though the proper application may be long way off, this is important work," says David Hawksett of the *Guinness Book of World Records*, who spearheaded the effort to come up with the new category—"world's smallest biological computing device."

Every so often *Guinness* creates new categories in emerging fields of science. Like scientific journals, *Guinness* invites experts in a particular field to review and evaluate new claims.

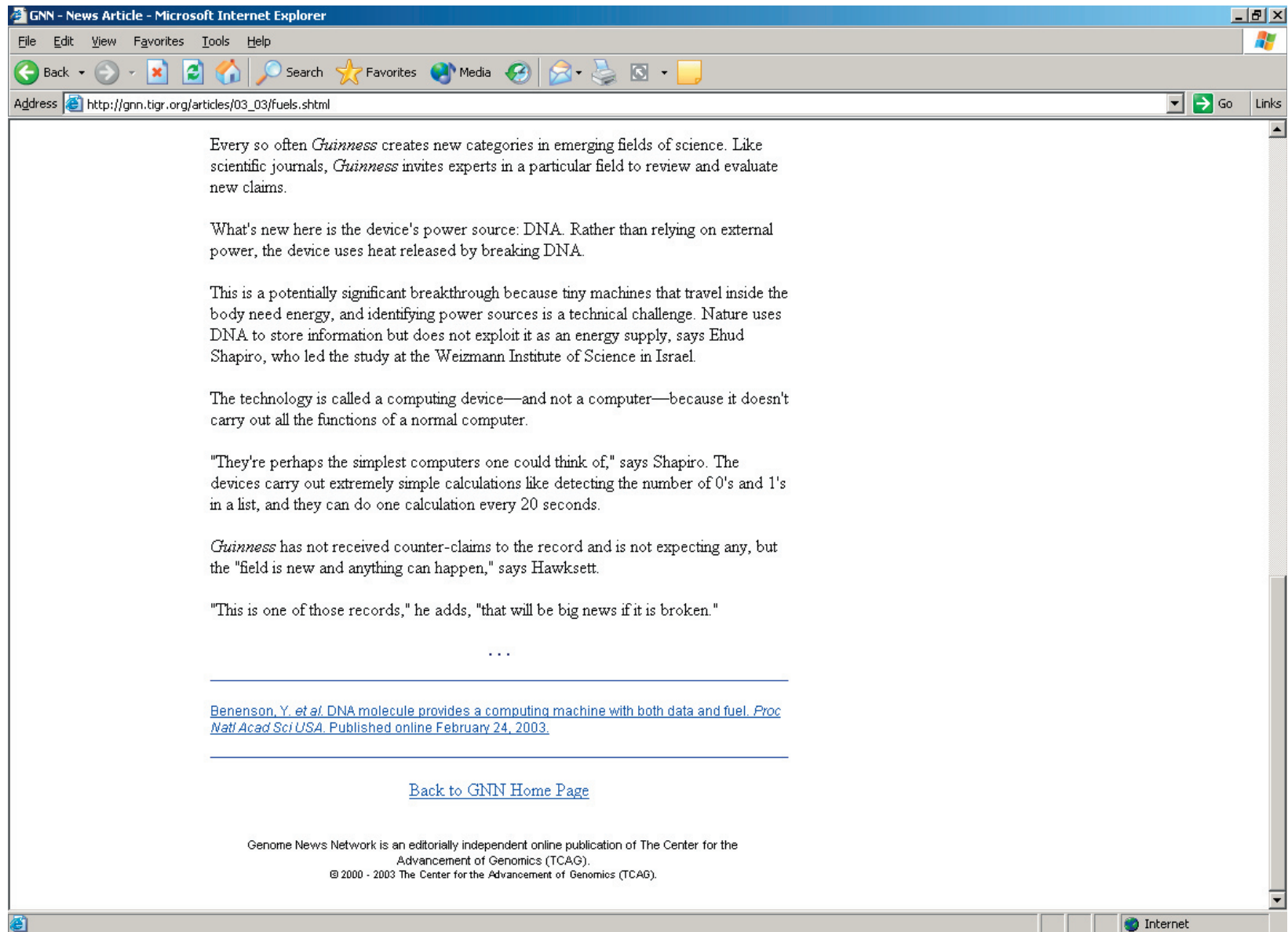
What's new here is the device's power source: DNA. Rather than relying on external power, the device uses heat released by breaking DNA.

This is a potentially significant breakthrough because tiny machines that travel inside the body need energy, and identifying power sources is a technical challenge. Nature uses DNA to store information but does not exploit it as an energy supply, says Ehud Shapiro, who led the study at the Weizmann Institute of Science in Israel.

The technology is called a computing device—and not a computer—because it doesn't carry out all the functions of a normal computer.

"They're perhaps the simplest computers one could think of," says Shapiro. The devices carry out extremely simple calculations like detecting the number of 0's and 1's in a list, and they can do one calculation every 20 seconds.

Guinness has not received counter-claims to the record and is not expecting any, but the "field is new and anything can happen," says Hawksett.



GNN - News Article - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Refresh Home Search Favorites Media Mail Print Share

Address http://gnn.tigr.org/articles/03_03/fuels.shtml Go Links

Every so often *Guinness* creates new categories in emerging fields of science. Like scientific journals, *Guinness* invites experts in a particular field to review and evaluate new claims.

What's new here is the device's power source: DNA. Rather than relying on external power, the device uses heat released by breaking DNA.

This is a potentially significant breakthrough because tiny machines that travel inside the body need energy, and identifying power sources is a technical challenge. Nature uses DNA to store information but does not exploit it as an energy supply, says Ehud Shapiro, who led the study at the Weizmann Institute of Science in Israel.

The technology is called a computing device—and not a computer—because it doesn't carry out all the functions of a normal computer.

"They're perhaps the simplest computers one could think of," says Shapiro. The devices carry out extremely simple calculations like detecting the number of 0's and 1's in a list, and they can do one calculation every 20 seconds.

Guinness has not received counter-claims to the record and is not expecting any, but the "field is new and anything can happen," says Hawksett.

"This is one of those records," he adds, "that will be big news if it is broken."

...

[Benenson, Y. et al. DNA molecule provides a computing machine with both data and fuel. *Proc Natl Acad Sci USA*. Published online February 24, 2003.](#)

[Back to GNN Home Page](#)

Genome News Network is an editorially independent online publication of The Center for the Advancement of Genomics (TCAG).
© 2000 - 2003 The Center for the Advancement of Genomics (TCAG).

Internet