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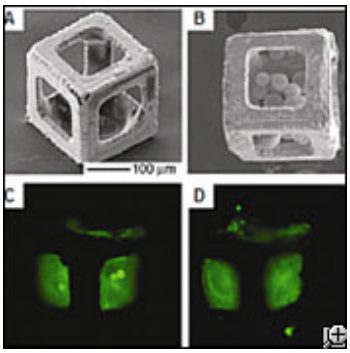

Assembled Cube

Tiny Cube Delivers Drugs

By Tracy Staedter, Discovery News

Dec. 28, 2005— A metal box no larger than a speck of dust could one day be used to deliver packages of molecules or cells to a patient's body for medical therapy.

The nanocube, designed by assistant professor David Gracias and his team at Johns Hopkins University, starts out looking like a flattened box, but when heat is applied, the sides fold up automatically to form the cube shape.

"The self-assembly technique allows us to make a large number of these microcontainers at the same time and at a relatively low cost," said Gracias, who reported his team's research in a recent edition of *Biomedical Microdevices*.

That's because the new method relies on existing techniques and chemistry already used to make semiconductor chips, which means that it can be moved relatively easily from the lab to mass production.

And because the container is made from metal, it can potentially be navigated to a specific place in the body and designed to release its therapeutic contents on demand.

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The researchers etched the flattened box from nickel and copper. While flat, the device looks like six small squares aligned in the shape of a cross. Special hinges join each square to its neighbor.

When the cross is heated briefly in a lab solution, the hinges melt slightly and create a tension that bends the sides to 90-degree angles. In this way, the device automatically folds into a cube.

After the box forms, the scientists cool the solution, which permanently hardens the joints to maintain the cube's shape.

"It's difficult to turn a two-dimensional structure into a three-dimensional structure. What Gracias is doing is finding a way to make these little cubes using a simple production," said professor Mauro Ferrari of Ohio State University and editor-in-chief of *Biomedical Microdevices*.

The team engineered the sides of the box to contain different-sized pores, through which they could inject therapeutic cells or microbeads coated with drugs. The pores also allow the drugs to seep out into the body at the appropriate time.

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