Scientists Find Strong Bacterial Glue

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BLOOMINGTON, Ind. — A common bacteria that clings to the inside of water pipes stays in place with the strongest glue known to exist in nature, according to a team of scientists that includes an Indiana University biologist.

The researchers found that the bacteria Caulobacter crescentus can withstand a force equivalent to five tons per square inch -- the pressure exerted by three or four cars balanced atop a quarter -- before it is swept from its moorings.

Yves Brun, the IU biologist who co-authored the research, said the super adhesive the bacteria produces could theoretically be mass produced for engineering and medical purposes, including as a biodegradable glue to replace sutures and staples in surgery.

"The challenge will be to produce large quantities of this glue without it sticking to everything that is used to produce it," he told The Herald-Times for a Tuesday story.

The findings appear in the April 11 issue of the Proceedings of the National Academy of Science. Brun co-authored the research with Jay Tang, a former IU physicist who now works at Brown University.

Brun has been working with C. crescentus -- a harmless and widely studied bacterium that lives in rivers, streams and water pipes -- since 1990 as part of his work to understand genetic processes involved in producing cells.

In their work, the team discovered that C. crescentus attaches itself to surfaces with a long, slender stalk tipped with chains of sugar molecules that are the source of its tenacity.

That substance is the strongest glue known to occur in nature and is three times as strong as commercial "super" glue products, Brun said.

Because it works under water, even in salty water, he said that suggests it could be used as a surgical adhesive, in joint replacement surgery and in dental procedures.

But figuring out how to do it will require solving scientific and engineering problems of surface chemistry and manufacturing processes.

IU engineer L. Ben Freund wrote the model used to analyze the bacteria's adhesive abilities. Peter Tsang and Guanglai Li of Brown University performed experiments and analyzed data.

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Source: Associated Press