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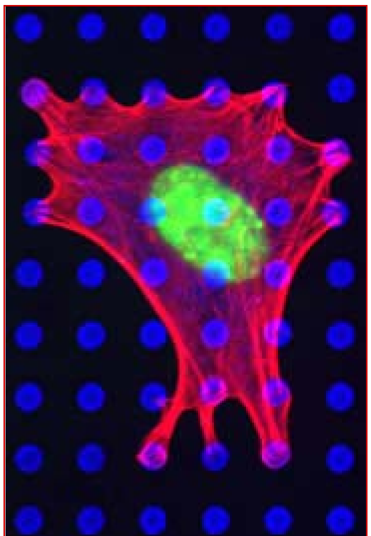
American Society for Cell Biology, San Francisco, December, 2002

Tiny rack tests cells' pulling power

Biologists study cell stretching on stamp-sized bed of nails.
17 December 2002

HELEN PEARSON



The more cells stretch out, the harder they cling to the nails.
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Even masochists lie gingerly on a bed of nails. Human cells, on the other hand, "impale themselves right on the posts", says biomedical engineer John Tan.

Tan and his colleagues at Johns Hopkins University in Baltimore, Maryland, have built a postage-stamp-sized bed of rubber needles to test cells' strength. They unveiled it this week at the American Society for Cell Biology's annual meeting in San Francisco, California.

Each needle is 20 times thinner than a human hair and bends according to how much the muscle cell tugs it. "It's sort of like crawling on a jungle gym," says Tan.

Biologists want to know how cells stretch into shape and haul themselves around the body. How much a cell is stretched can decide whether it divides, matures or dies. Like slugs, cells have to cling to surfaces to expand and move.

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Unravelling these forces might help to explain how tumour cells migrate to a new susceptible site in the human body, negotiating barriers on the way. "They have to recognize bone versus cartilage," says Karen Beningo, who studies cell migration at the University of Massachusetts in Worcester.

Using the miniature rack, Tan's team found that the more the cells stretch out, the harder they cling to the nails. To encourage cells to reach out, the researchers painted the tops of a square of 4, 9 or 16 posts with a molecule that sticks cells down.

Previously, researchers measured cellular strength with silicone sheets and watched where they wrinkle up, Beningo explains, but it is hard to distinguish where the forces come from. Instead, she watches embedded fluorescent beads twitching as cells thrash around in a polyacrylamide gel.

Beningo believes that many researchers are mistaken about the natural shape that cells adopt - because they observe them on a flat surface. Stuck to surfaces on both front and back, three-dimensional skin cells move by means of stringy tentacles, rather than the fan-like probes that many researchers see, she warns.