TODAY'S HEADLINES

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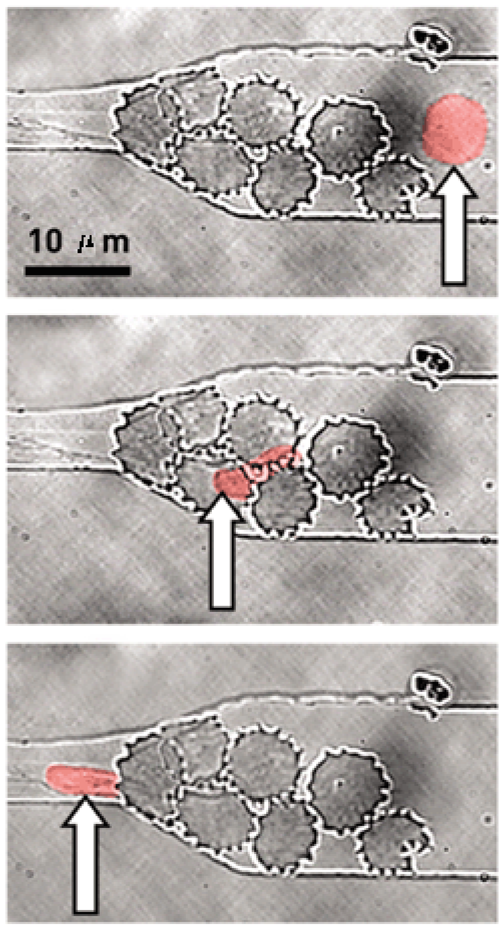
DISEASE PROCESSES

MIMICKING MALARIA

Microfluidic device shines light on mechanical aspects of malaria infection

CELIA HENRY

Malaria kills more than 2 million people every year, but the pathology of the disease is still not well understood. Chemists at the University of Washington, Seattle, hope that a microfluidic device will shed light on the mechanical aspects of malaria pathology and provide a platform for screening potential drugs.



CLOGGED **Malaria-infected red blood cells become rigid and block the capillary. Normal cells (shown in red) can still snake their way through the blockage, as seen in this time sequence. This may explain why blood transfusions can help alleviate malaria symptoms. ADAPTED FROM *PNAS***

The team, led by professor Pradipsinh K. Rathod and assistant professor Daniel T. Chiu, use polydimethylsiloxane (PDMS) channels with diameters ranging from 2 to 8 μm [*Proc. Natl. Acad. Sci. USA*, published online Nov. 24, http://www.pnas.org/cgi/doi/10.1073/pnas.2433968100]. The microfluidic device allows the mechanical aspects of what happens in capillaries to be studied.

Red blood cells infected with the malaria parasite *Plasmodium falciparum* are allowed to flow through the channels. As the life cycle of the parasite advances, the cells become increasingly rigid and they clog the capillaries because they are unable to deform themselves to fit through them.

"We show that many of the features that pathologists have seen in tissue sections from patients who died from malaria can be explained just from the mechanical properties," Rathod says. "The ability of mature, infected red cells to concentrate at the mouth of the capillary can be explained purely in terms of mechanical properties."

"This might be a useful platform to use to screen for drugs that target malarial red blood cells," Chiu says. "There are a few drugs that alleviate the symptoms of severe malaria. It will be interesting to see what happens physically to the cell as those drugs are applied and how its rigidity changes."

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