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SlipChip performs PCR

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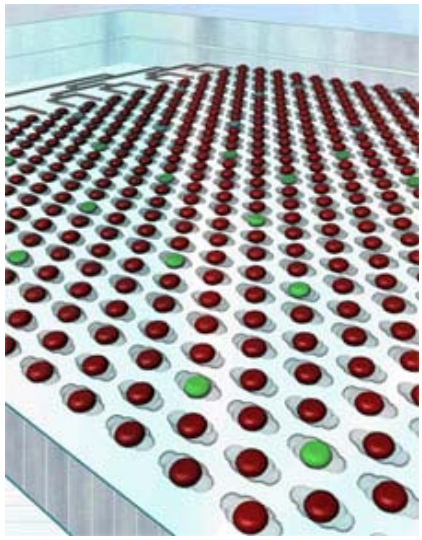
Scientists in the US are using a simple microfluidic device to perform the polymerase chain reaction (PCR).

In PCR thousands of copies of a particular DNA sequence are generated via cycles of repeated heating and cooling - a process known as amplification. The DNA copies can then be used for cancer research, prenatal diagnostics and DNA profiling in forensic science. Previous attempts to miniaturise PCR have always required mechanical systems to open and close the valves controlling the reaction, but now Rustem Ismagliov and his team at the University of Chicago have used a simple device, called a SlipChip, to amplify *Staphylococcus aureus* DNA.

The SlipChip is a device that relies on the movement, or 'slipping' of two plates imprinted with wells and ducts. As the plates slip passed each other the wells and ducts are brought in and out of contact to combine reagents and perform reactions. Ismagliov designed the device in 2009 demonstrating its use in protein crystallisation. Now they are using it to amplify and copy small amounts of DNA by performing the PCR without needing mechanical valves or pump action.



The slip chip contains many wells to perform digital PCR

Feng Shen, a member of the of the team, says that their method 'avoids both a complex fabrication process and a complex manipulation system' and meets the need for 'a simple and inexpensive platform to apply digital PCR in laboratories and resource-limited settings'.

Claus Poulsen, an expert in PCR from Dublin City University, Ireland, says 'the SlipChip is a nice example of achieving the goal of microfluidics as the system makes an elaborate method (digital PCR) easy to perform due to automatic handling of minute samples by the device.'

Ismagliov and his colleagues are now working on using SlipChip-based digital PCR for the analysis of rare cells and the detection of mutations.

Hilary Burch

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Link to journal article

Digital PCR on a SlipChip
Feng Shen, Wenbin Du, Jason E. Kreutz, Alice Fok and Rustem F. Ismagilov, *Lab Chip*, 2010
DOI: 10.1039/c004521g

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