

NEWS | DECEMBER 04 2020

Chromosome separator improves on previous techniques

FREE

Mara Johnson-Groh



Scilight 2020, 491104 (2020)

<https://doi.org/10.1063/10.0002864>



View
Online



Export
Citation

CrossMark

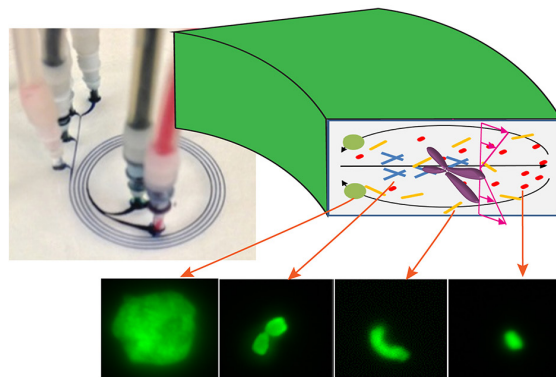
2 December 2020

Chromosome separator improves on previous techniques

Mara Johnson-Groh

Using an inertial focusing device, scientists have come up with a better way to quickly and easily separate chromosomes and other non-spherical particles.

Chromosome Separation using Inertial Focusing



There are many ways to separate chromosomes, such as centrifugation, mechanical filtration, and fluorescent activated cell sorting, but they all come with their own perks and quirks. Seeking a more well-rounded solution, Feng et al. developed a separation method using a spiral channel inertial focusing device.

The inertial focusing device works by driving material through an open channel with multiple outlets. As the chromosomes align, their shape and size differences cause them to flush out to specific areas in the channel due to the Dean drag force and inertial lift force. As a result, the method allows for chromosomes to be quickly sorted by size and shape.

The authors successfully tested the method using cell lysate – a mixture of cell debris, metaphase chromosomes, and nuclei – as well as spherical beads to ensure the spiral channel worked as intended. They also created a mathematical model to analyze the chromosome shape separation, which helped them refine and streamline the operation.

The method has been previously applied to blood cells, tumor cells, and sperm. The authors think it could also be extended to be used for a wider range of particles, potentially for applications such as bacteria subtype separation and chromosome karyotyping.

“Our inertial microfluidics approach eliminates essentially all of the previous limitations except that it does not remove all of the small debris, because the smallest debris does not focus,” said author Himanshu Sant. “We foresee the use of this chromosome separation technique having implications in developmental biology.”

Source: “Size and shape based chromosome separation in the inertial focusing device,” by Haidong Feng, Matthew Hockin, Mario Capecchi, Bruce Gale, and Himanshu Sant, *Biomicrofluidics* (2020). The article can be accessed at <https://doi.org/10.1063/5.0026281>.

Published by AIP Publishing (<https://publishing.aip.org/authors/rights-and-permissions>).