Hi, I am ラージ マカバータイ, associate editor for news and features in the journal Analytical Chemistry.

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The image on the cover of the December 1st issue, designed by Julie Farrar Art Director of the Analytical Chemistry, depicts single cells in individual micro-fabricated wells.

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The image comes from the feature article in this issue, written by Dino Di Carlo and Luke Lee at the University of California, Berkeley, who discuss how the high-throughput analysis of dynamic cellular processes may provide better information on a cellular behavior.

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Biologists are very interested in how a cell processes time dependent signals, such as environmental stimuli to give specific responses.

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For instance, behavior like stem-cell differentiation and self-renewal are closely connected to the cell surrounding microenvironment.

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Cell division and apoptosis are, in most cases, directed by extracellular signals that change in space and time.

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If researchers are able to predict relationship between input signals and cellular responses in individual eukaryotic cells, they would have better understanding of the higher-level organization of tissues and organisms.

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More importantly, the understanding may lead to therapies to correct flaws in this organization.

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In the ideal world, knowing the history of environmental stimuli should allow researchers to predict the precise behavior of a particular cell.

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Unfortunately, this is not the case.

Cells under seemingly identical environmental conditions often display a distribution of different behaviors.

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Because of the variation within the population, Di Carlo and Lee discuss how it could be more useful to analyze a large number of individual cells, and determine the distribution of the individual responses.

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The authors talk about controlling in feature surroundings for cell culture to allow environmental variables to be probed in a dynamic and high throughput way.

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But dynamic control of the environment is not possible in experimental systems based on wells and Petri dishes.

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And bioreactors can’t control the cell-contact environment.

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So Di Carlo and Lee demonstrated how new tools based on microfabrication technology and microfluidics, are now allowing improved dynamic control of different environmental variables for high-throughput single-cell analysis.

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They explained that these technologies along with systems analysis of cellular signaling pathways can lead to a more complete understanding of the function of individual cells.

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We invite you to read more about dynamic single cell analysis of quantitative biology in the cover story by Di Carlo and Lee, and the rest to the content of December 1st issue of the Analytical Chemistry.

We hope you to enjoy it.