

Single-cell on-time molecular analysis by hyper-sensitive video-mass scope

Tsutomu Masujima

(Hiroshima University, Graduate School of Biomedical Sciences, professor)

【Outline of survey】

When we are able to analyze molecules of visualized reacting cells directly in real time, studies of molecular mechanisms of living systems will become more direct and fast. Thus we should seek a very sensitive and exhaustive molecular detection method for a single cell with simultaneous video-microscopic observation

We have developed the method to detect hundreds to thousands of small molecular MS peaks from a living single cell to extract and identify the key molecules specifically existing in a cell. We will further develop this new method as a quick methodology for findings of new medicinal molecules, new factor of differentiation for re-generative medicine and for finding new molecular mechanism of living systems.

【Expected results】

1. Acceleration of molecular mechanism analysis of living systems.
It is already found that the results with many cells are not always true for a single cell level. It is also possible to show a full metabolomics in a organelle.
2. Accelerated finding of new medicinal molecules and its task in a cell.
3. The analyses of molecular mechanism of diseases and application to diagnosis
4. Finding of new factor of cell differentiation for re-generative medicine.
5. Wide applications for nano-medicines and nano-technologies.

【References by the principal investigator】

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2. Tsuyama N, Mizuno H, Tokunaga E, Masujima T. "Live Single Cell Molecular Analysis by Video-Mass Spectrometry" *Anal. Sci.* **24**, 559 (2008).
3. Masujima T, Tsuyama N, Hasegawa T. "Video-visualization of dynamic cell responses and its molecular analysis for nanomedicine." *Nanomed.* **1**, 331 (2006).
4. JP PAT No.4129587 "Mass Filter for Mass Spectrometer" and 6 applications for Pat

【Term of project】 FY2008– 2011

【Budget allocation】

160,700,000 yen (direct cost)

【Homepage address】

<http://home.hiroshima-u.ac.jp/analytic//>