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## Shimadzu's new culture media analyzer platform for fundamental research and process development in cell cultures

The recent developed C2MAP™ system measures component changes in a culture supernatant as culturing progresses using LC/MS/MS. This system can be used for a wide range of applications, from basic research of cell cultures including pluripotent stem cells (iPS cells and ES cells), mesenchymal stem cells, and antibody-producing cells, to scaling up of culture volumes and actual process development.

Optimization and control of cell culture processes are essential to increase production efficiency of biopharmaceuticals. In the field of cell therapy, enhanced control of the culture process is also becoming important to reduce cell variability and improve consistency of mass production of the cells. Comprehensive monitoring of culture supernatant components gives researchers useful information for these purposes. However, current technologies for process monitoring are limited to measurement of pH, dissolving gases, and some small compounds such as glucose, glutamine, lactate, and ammonia.

Shimadzu Corporation has developed a “Cell Culture Media Analysis Platform, C2MAP system” that can provide simultaneous analysis methods for up to 95 components, making it suitable for component analysis to determine cell growth and status quality. The dedicated C2MAP TRENDS viewer software can graph component variations across multiple conditions for easier comparative analysis. The system can provide useful insights for the optimization of culture conditions in cell cultures by monitoring the consumption and depletion of media components during culturing, as well as the variation in metabolites secreted from cells.

The main features of the C2MAP System:

- Automated process from pretreatment to measurement for the culture supernatant analysis
  - ✓ With an automated process from pretreatment to measurement, automatic analysis can be performed at night and on non-working days.
  - ✓ The measurement workflow can be selected to match the actual culture.
  - ✓ Seamless analysis and management from pretreatment to LC/MS/MS measurement can be performed.
  - ✓ Pretreated samples are stocked on a microplate automatically to enable re-measurement with ease.
- Supports a wide range of Measurement compounds and culture supernatant samples
  - ✓ A total of 95 components, including major basal culture media components for animal cells and secreted metabolites, can be simultaneously analyzed at high speed.
  - ✓ Applicable to a wide range of cell culture media (iPS cells, ES cells, mesenchymal stem cells, T cells, and CHO cells).

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➤ Visualization of component variations in culture media

✓ Temporal changes in the components can be displayed as trend graphs.

✓ The results under multiple experimental conditions can be overlaid in the display, enabling comparative analysis.

For results obtained via LC/MS/MS, temporal changes in each component can be graphed by the dedicated viewer software. Analysts can monitor variations in metabolites secreted from cells and culture media components during cultivation, as well as display graphs of component comparisons with samples from different culture series. As a result, the consumption and depletion of culture media components, and changes in the amounts of metabolic components secreted from cells, can be observed, thereby providing useful insights into considerations of the optimal culture conditions and assessments of cellular status.