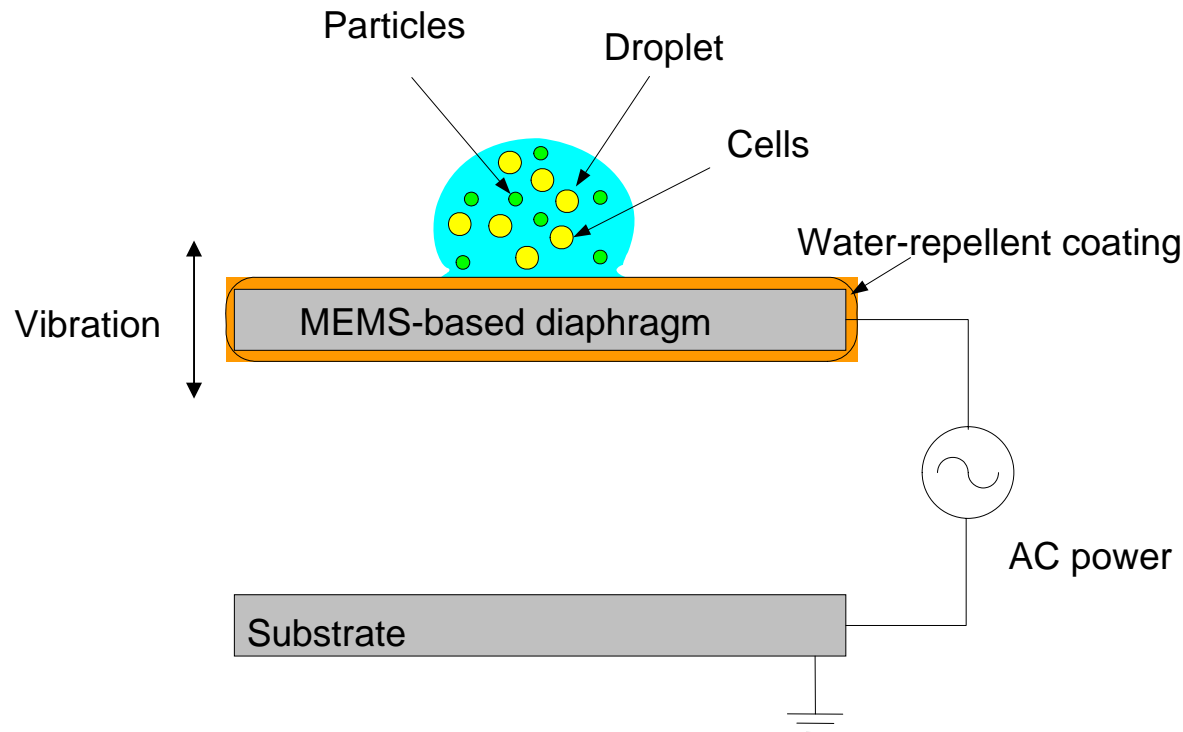


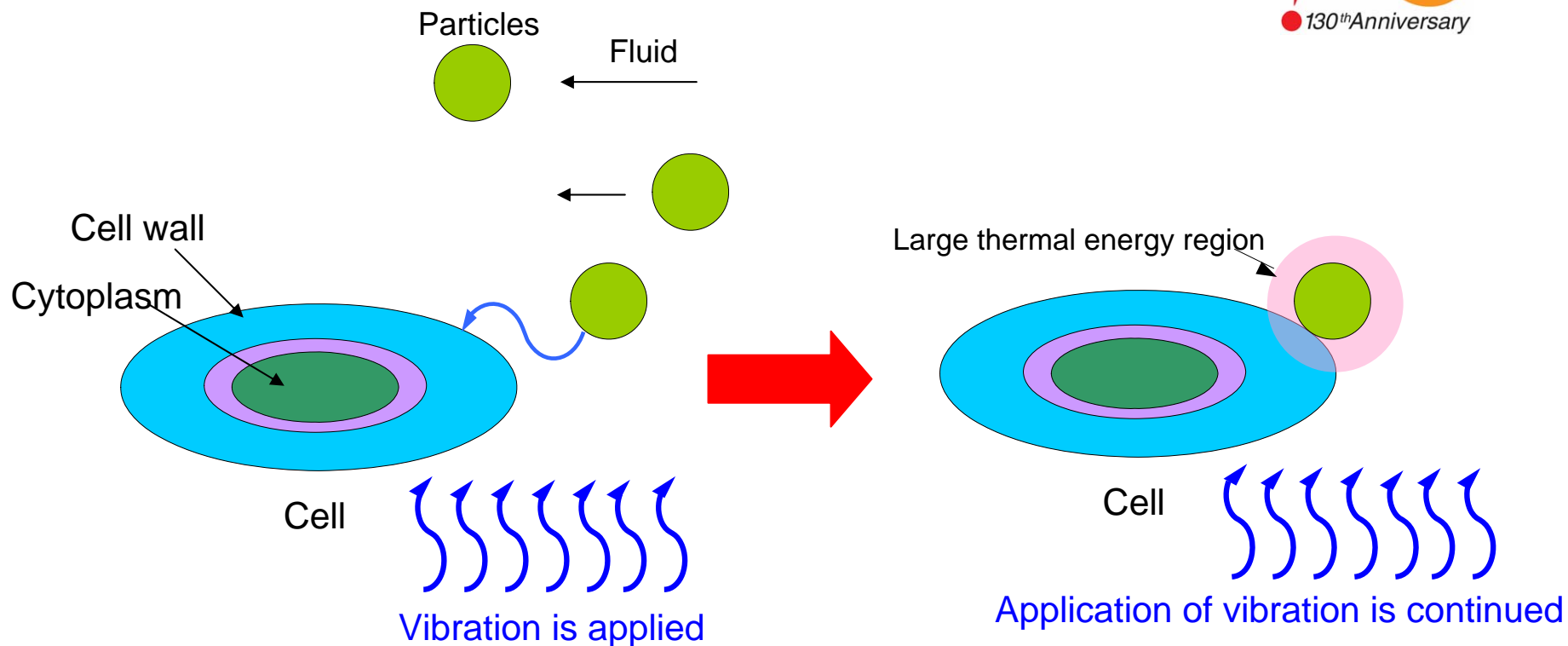
■ Principle of the Technology



* Silica particles and yeast cells were used for the experiment.

- 1) A droplet containing cells and nanoparticles is placed on the MEMS-based diaphragm and vibration is applied.
- 2) The fluid is excited by vibration and particles move at a higher speed than cells.
- 3) Particles become immobile when they adhere to cell surfaces.
- 4) In the case of immobile particles, vibration does not lead to movement and is converted to thermal energy.
- 5) Thermal energy is applied to cell surfaces.

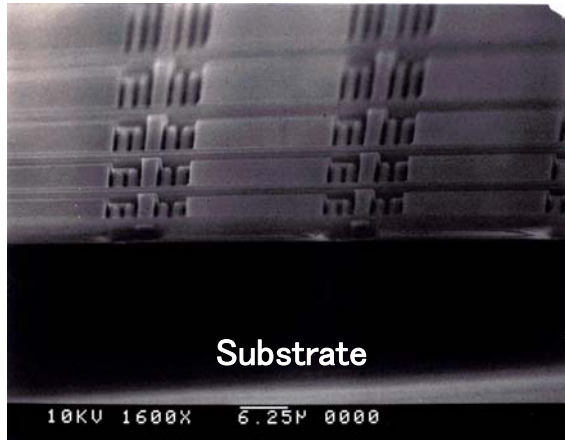
■ Principle of the Technology (Details)



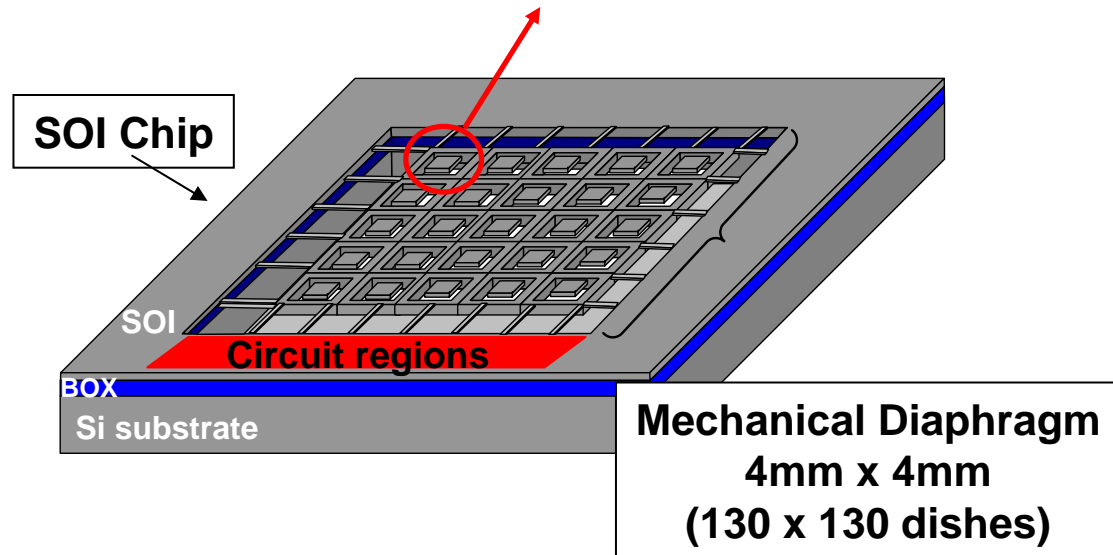
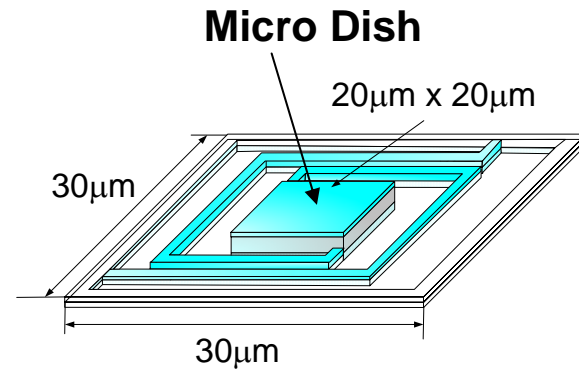
The nanoparticle manipulator applies vibration to the liquid, causing the liquid to flow. This flow facilitates adhesion of nanoparticles to cells.

Boundary temperature in the vicinity of a particle adhering to a cell increases due to the vibration energy applied and the particle affects a cell wall.

■ Structure of MEMS Device



Scanning electron
Microscope image



■ Microscopic Image

	Yeast cell & Silica particle	After excitation (30V 1kHz signal)
Optical microscope		
Laser microscope		