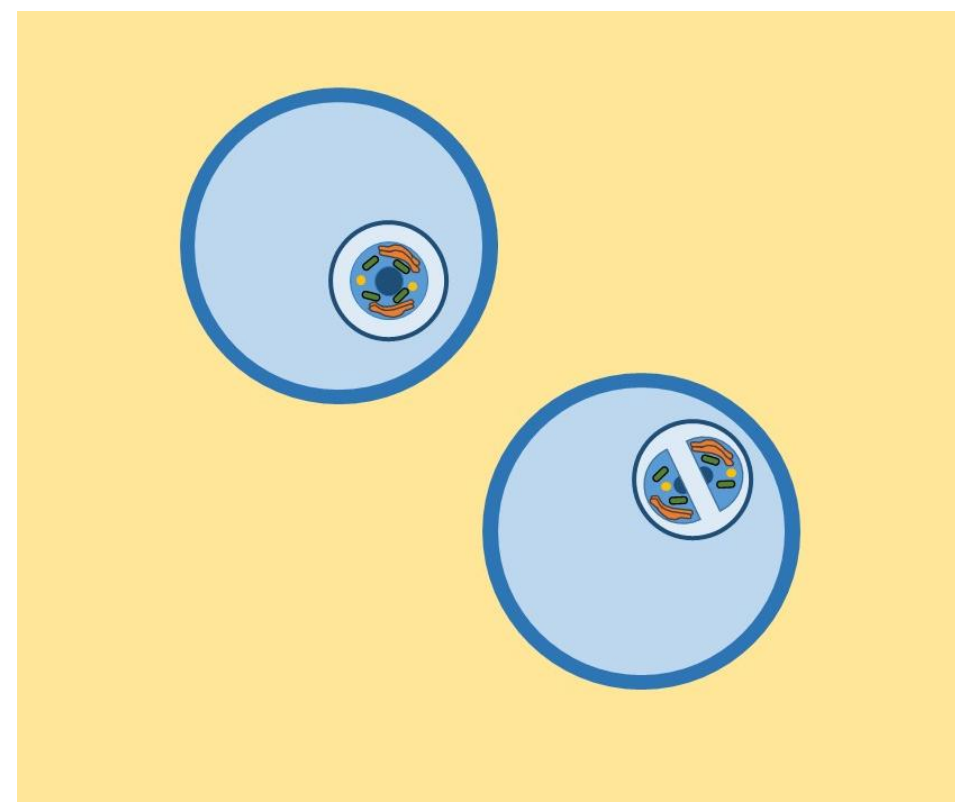


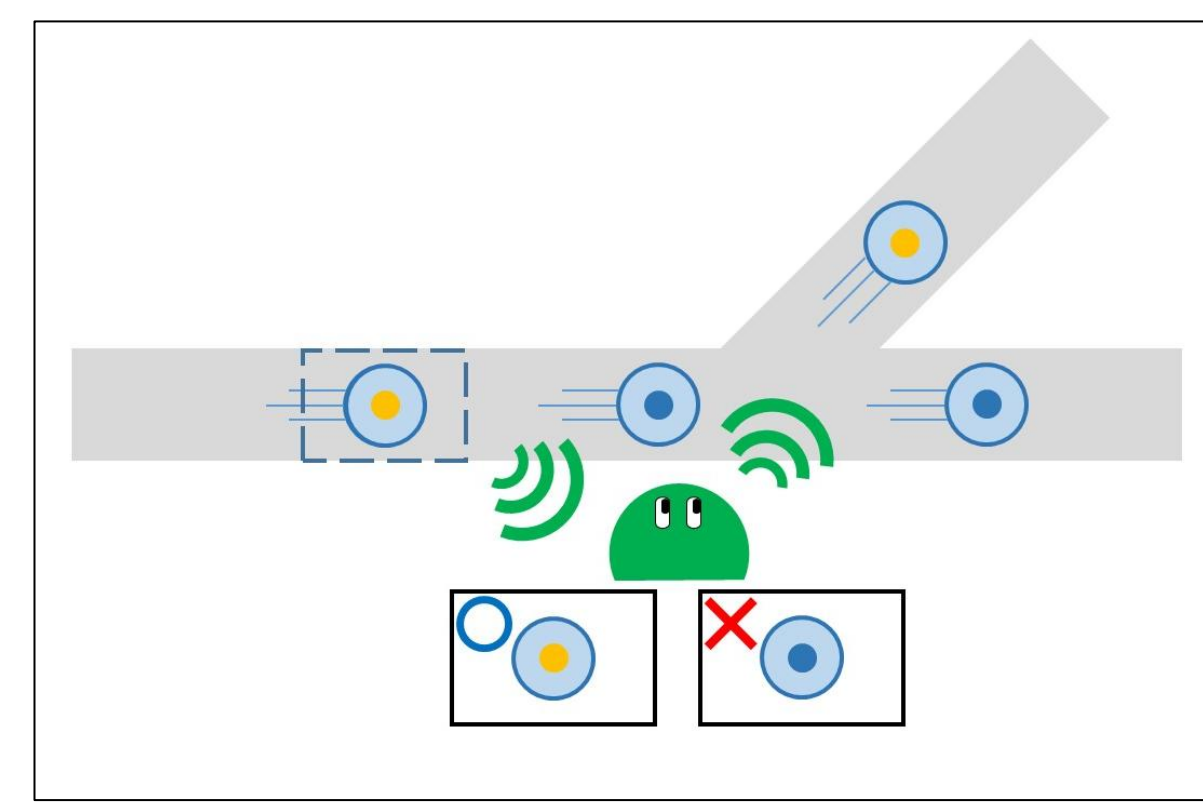
Background

◆ Microdroplets (MDs)



- Droplets of < 1 mm in diameter in oil.
- Advantages include the prevention of contamination, reduction in chemical use, and mass production in a short time.
- Cells can be encapsulated and cultured within the aqueous phase.

◆ Imaging sorter



Conventional:

Cell sorters which sort out cells based on **image identification**.

New:

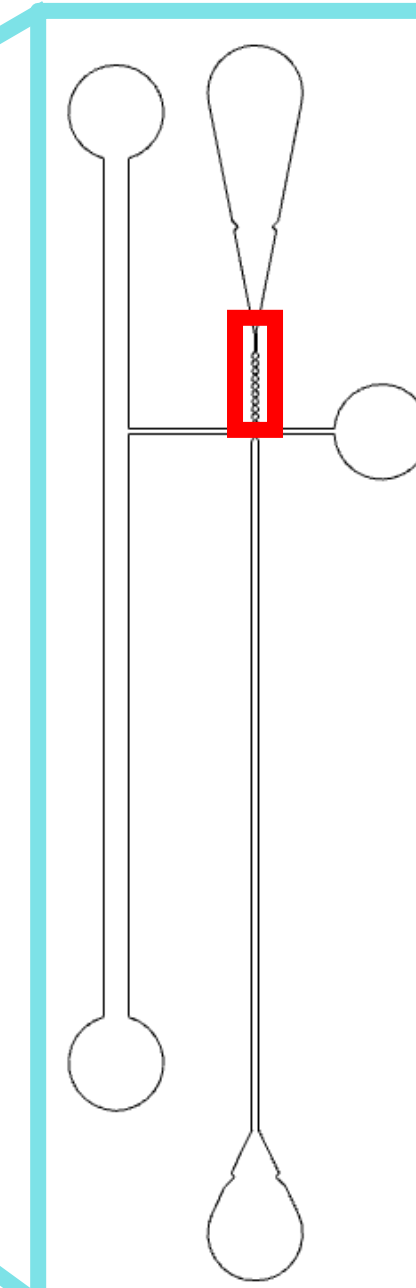
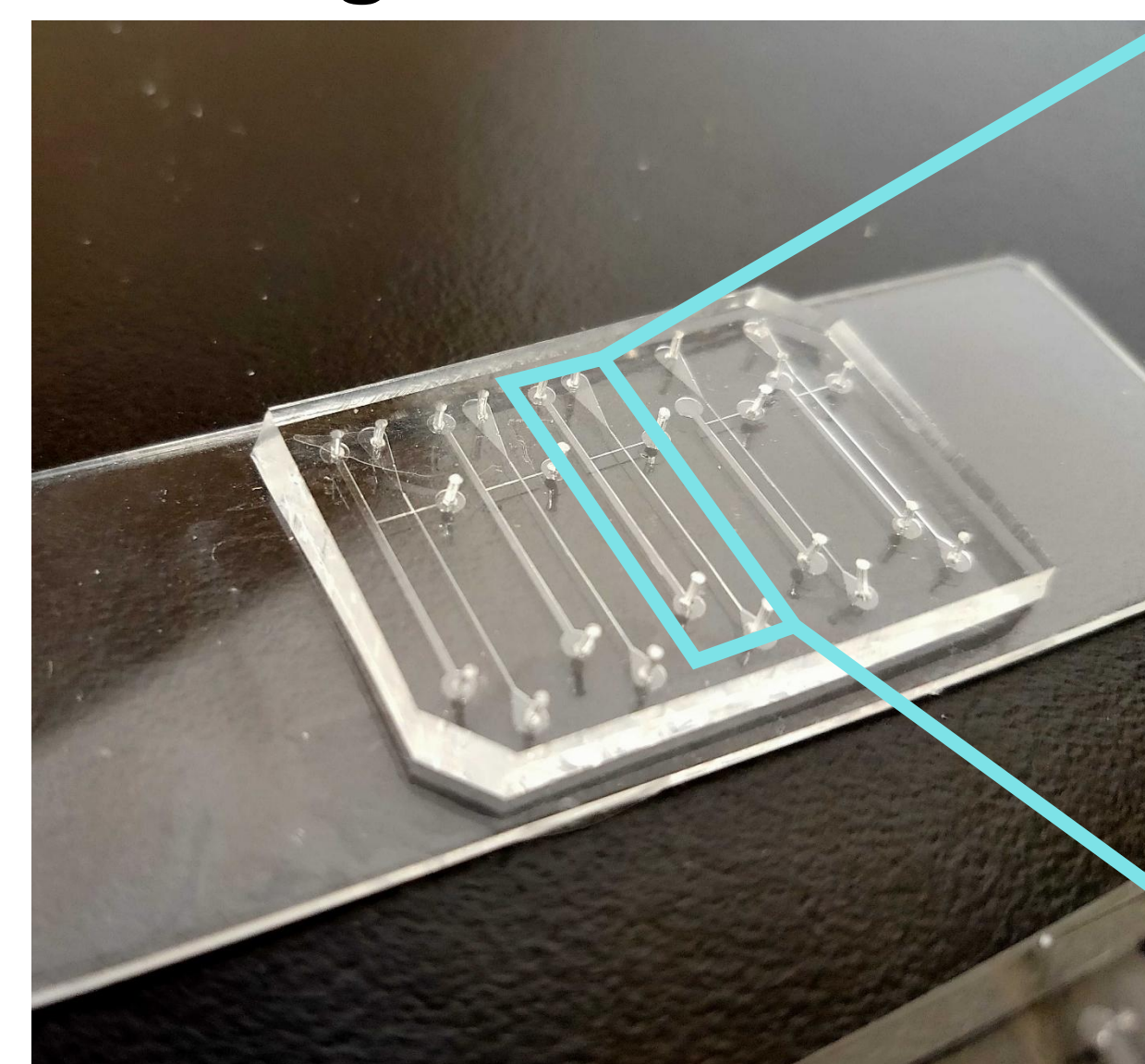
Development of an imaging sorter that **utilizes MDs**.

Issue

Needs to enable high-definition imaging.

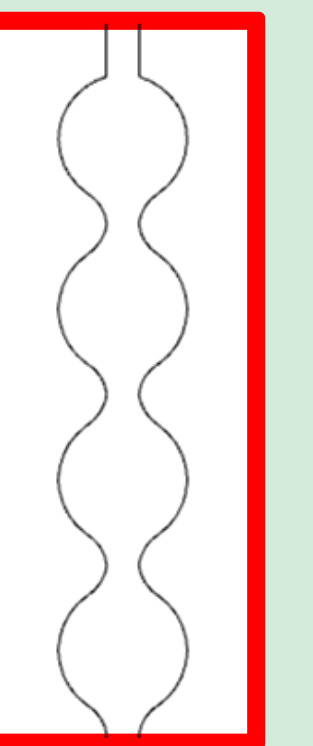
MDs should be supplied at relatively uniform time intervals.

◆ Sorting channels for MDs



Tufted sections:

- MDs are trapped in **each** tufted section.
- The **distance interval** between MDs is kept constant.
- The **time interval** between MDs is kept constant.



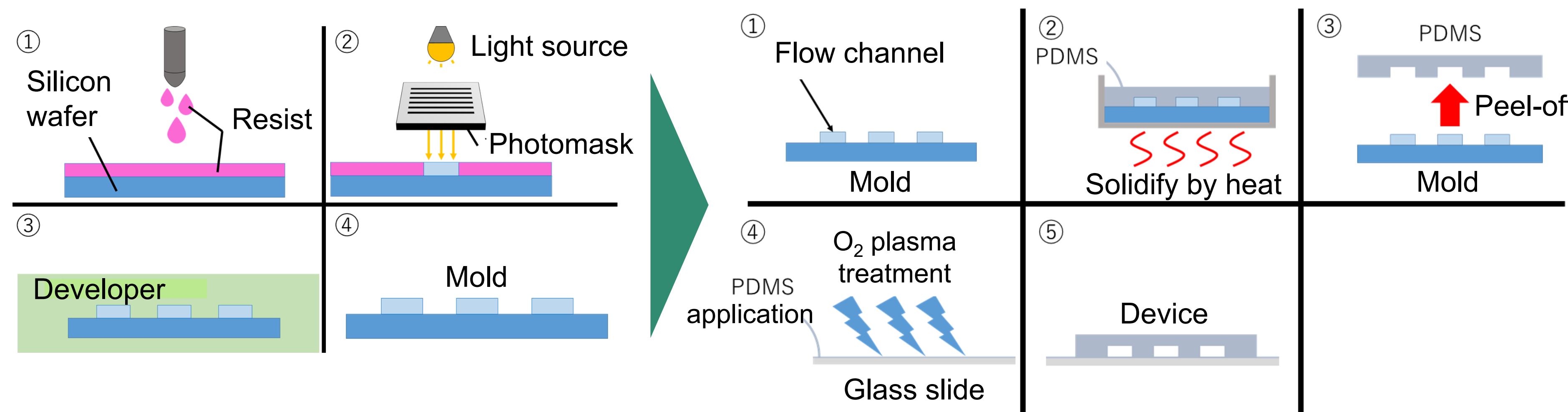
Dispensing sections:

- Dispense MDs.

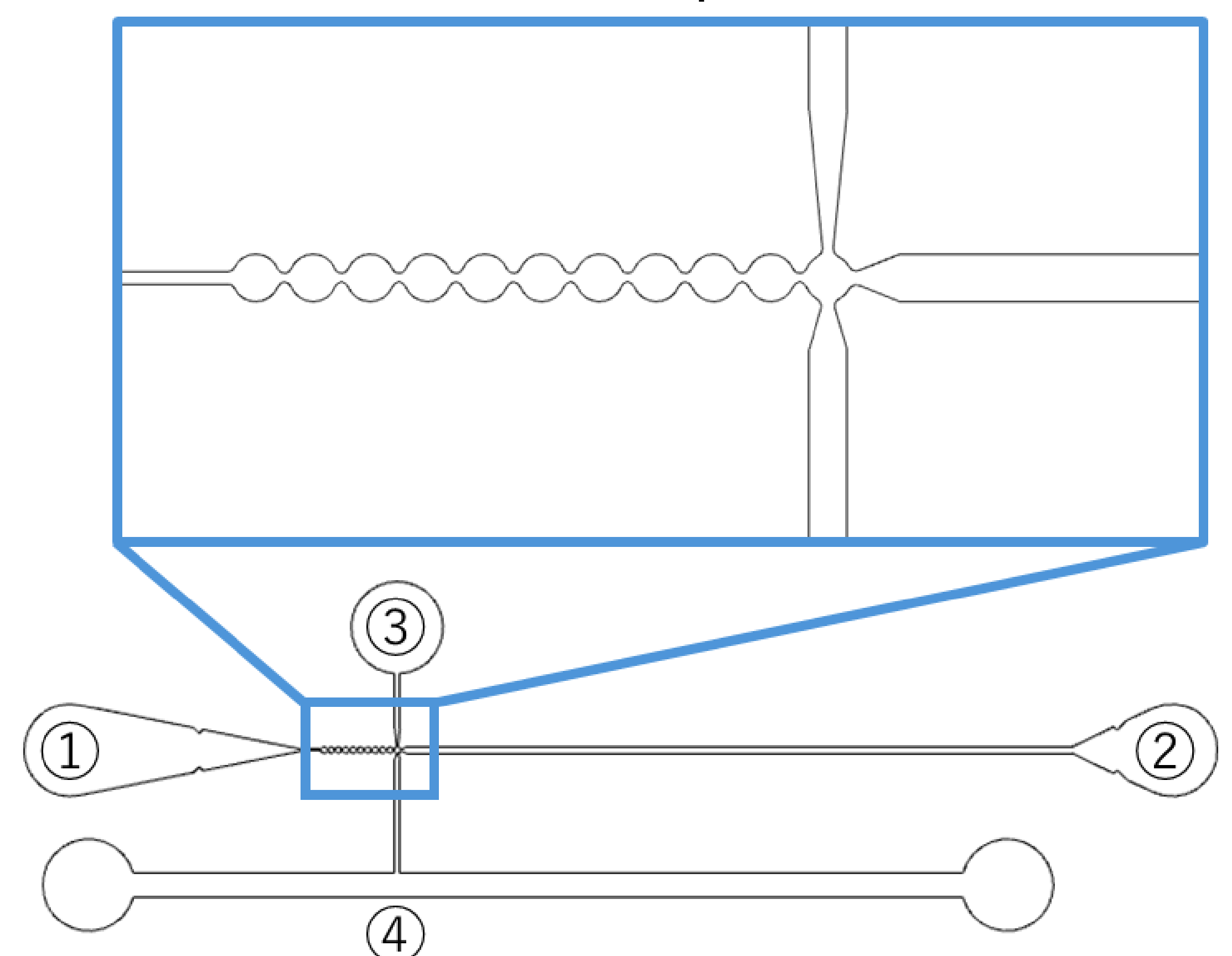
Research objective: **Development and performance evaluation of microfluidic channels for image acquisition and MD sorting.**

Experimental Procedures

◆ Fabrication of microfluidic channels



◆ Microfluidic channel shape



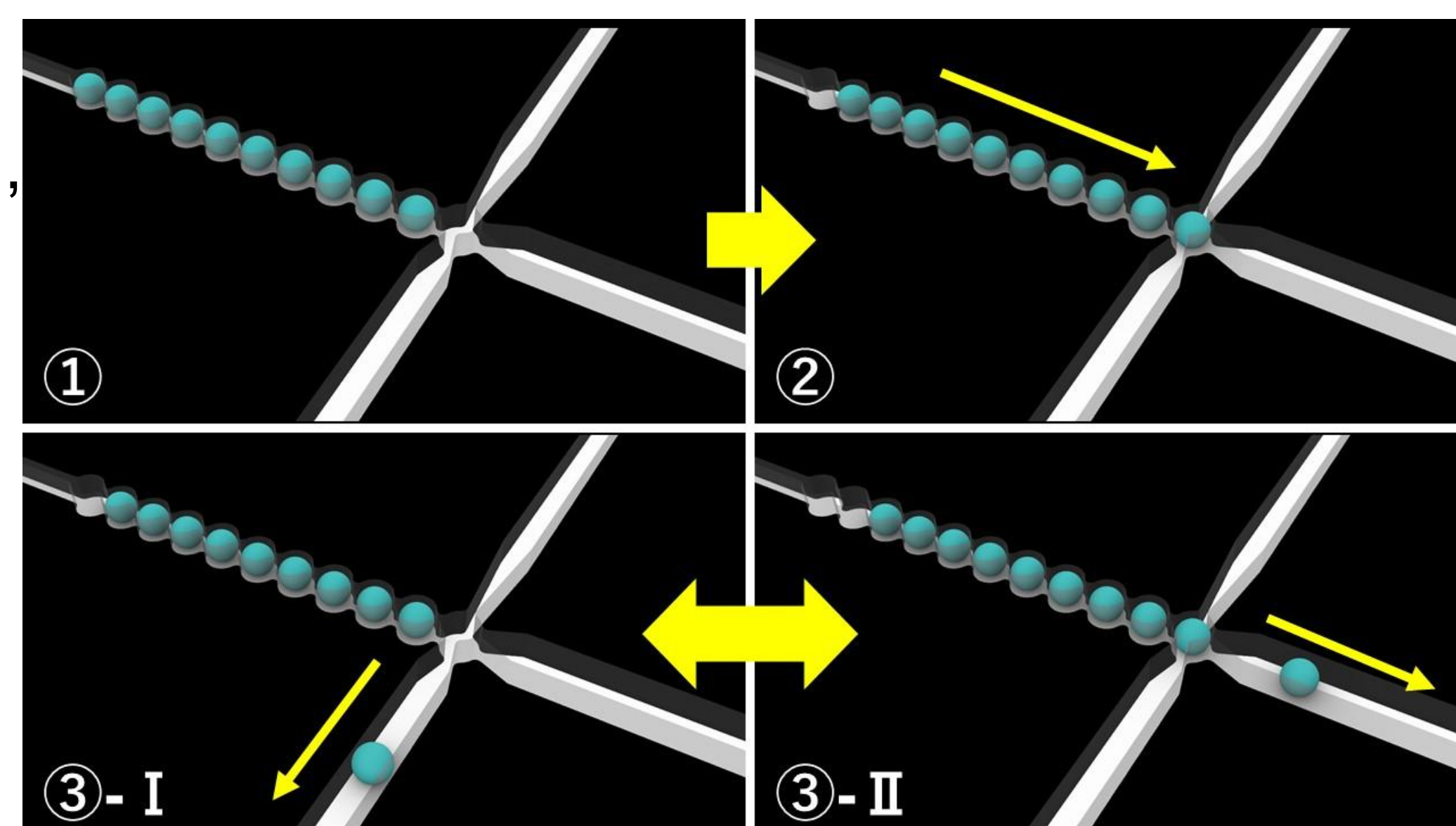
- ①→②: MDs are pumped using a glass syringe.
- ③→④: A solenoid valve and a continuous pumping system generate pulsed flow using oil only.

◆ Method

MDs and oil are pumped into the channel, and the device operates under the assumption that :

- A) MDs are **eligible** for dispensing.
- B) MDs are **not eligible** for dispensing.

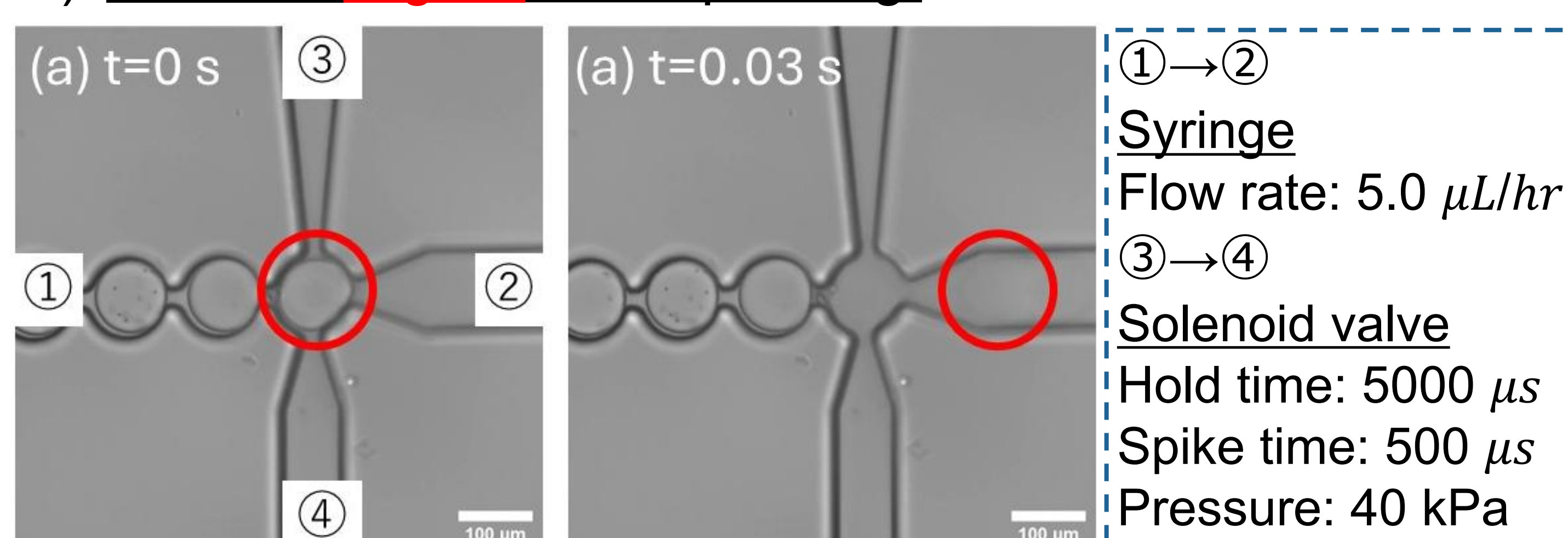
Microscopic observation



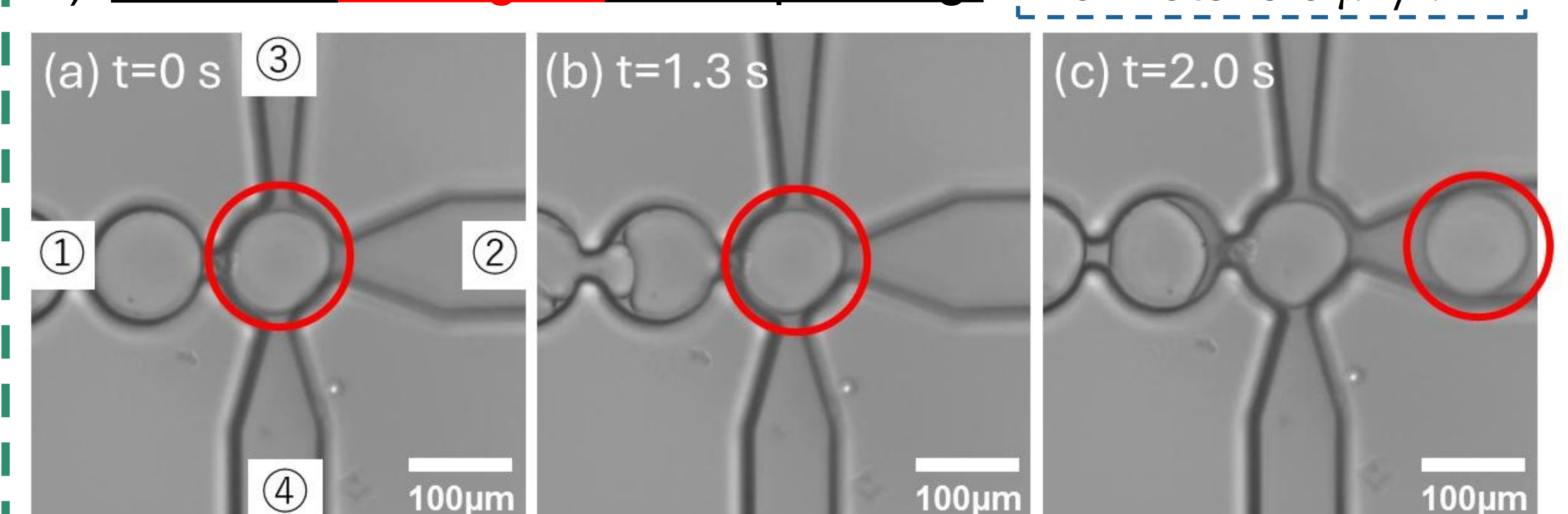
Results

◆ Observation results

A) MDs are **eligible** for dispensing.



B) MDs are **not eligible** for dispensing.



Conclusion and Future Works

- We established a method to keep the shape of MDs and move them one at a time with the microfluidic channels we fabricated. → We'll continue to examine the microfluidic channel shapes and conditions for dispensing MDs.