

'μDicer' for Uniformly Sectioning Tissue Samples

Stanford researchers in The Tang Group have developed a reproducible, high throughput device that dices tissue into uniformly sized sub-millimeter sample fragments. Commonly used manual mincing (figure 1) produces samples of varying sizes (figure 3) with potentially unwanted variations in subsequent assays. The Tang Group's "μDicer" (figure 2) quickly and reliably generates uniformly sized 100-300 μm fragments. Researchers fabricated prototypes from 500-micron thick silicon wafers, and then tested the prototypes with soft material and tissue. Device optimization is ongoing, especially for dicing cancer tumors and other tissues, and capturing the fragments for spatial-omics research. Ultimately, the μDicer will facilitate tissue sample preparation for applications like genetic screening, drug screening, and spatial-omics.

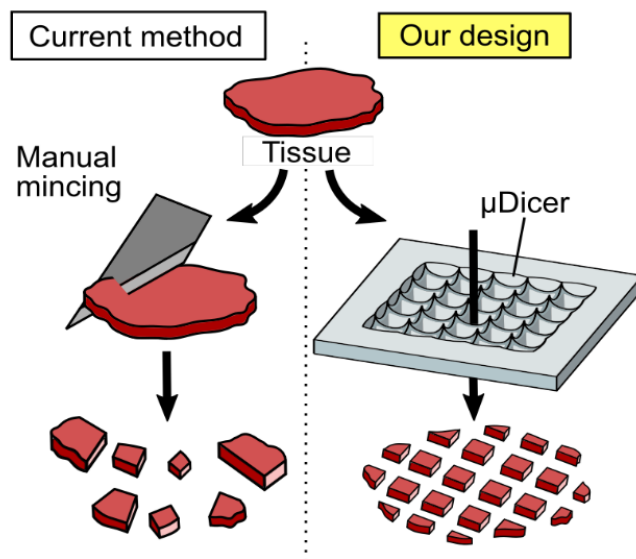


Figure 1 Schematic of manual mince (left), μDicer (right)

Image Courtesy The Tang Group

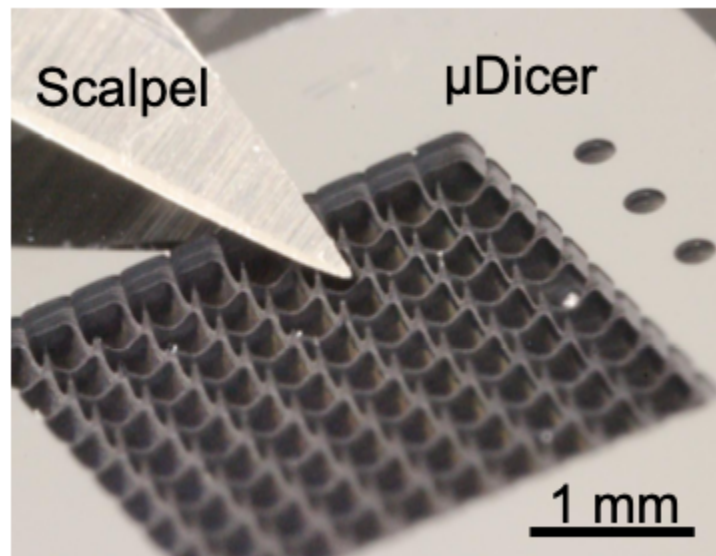


Figure 2 The μDicer next to #10 surgical scalpel commonly used for manual mincing.

Image Courtesy The Tang Group

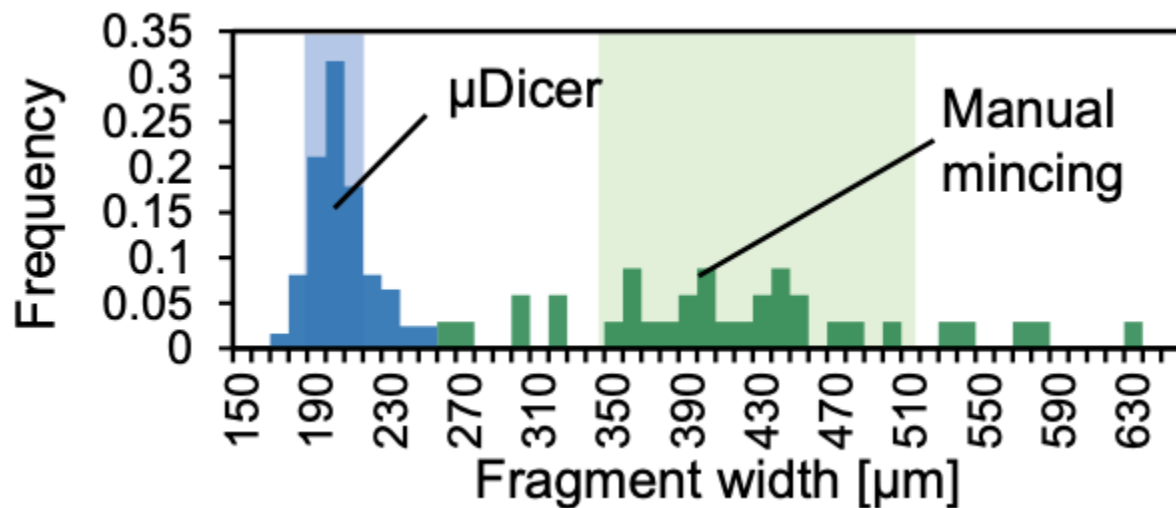


Figure 3 Mean fragment width dicing 5% agar manually and with a μDicer with an opening width of 195.75 μm

Image Courtesy The Tang Group

Stage of Development - Prototype

Applications

- Biopsy tissue samples for drug and genetic screening
- Generating fragments for tissue culture studies
- Dicing tissue for spatial-omic studies of molecules, cell distributions within tissues, and location-specific gene expression
- Dicing soft materials into uniform fragments

Advantages

- Uniform submillimeter sample size (100-300 μ m)
- Accurate, reproducible, and repeatable
- High throughput, less time consuming

Publications

- Cordts, S. C., Castaño, N., Koppaka, S., & Tang, S. K. (2021). [Fabrication of a silicon \$\mu\$ Dicer for uniform microdissection of tissue samples](#). *Applied Physics Letters*, 119(1), 011904.

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