Fabrication of Laser-activated Substrates for Intracellular Delivery

Daniel Villarreal
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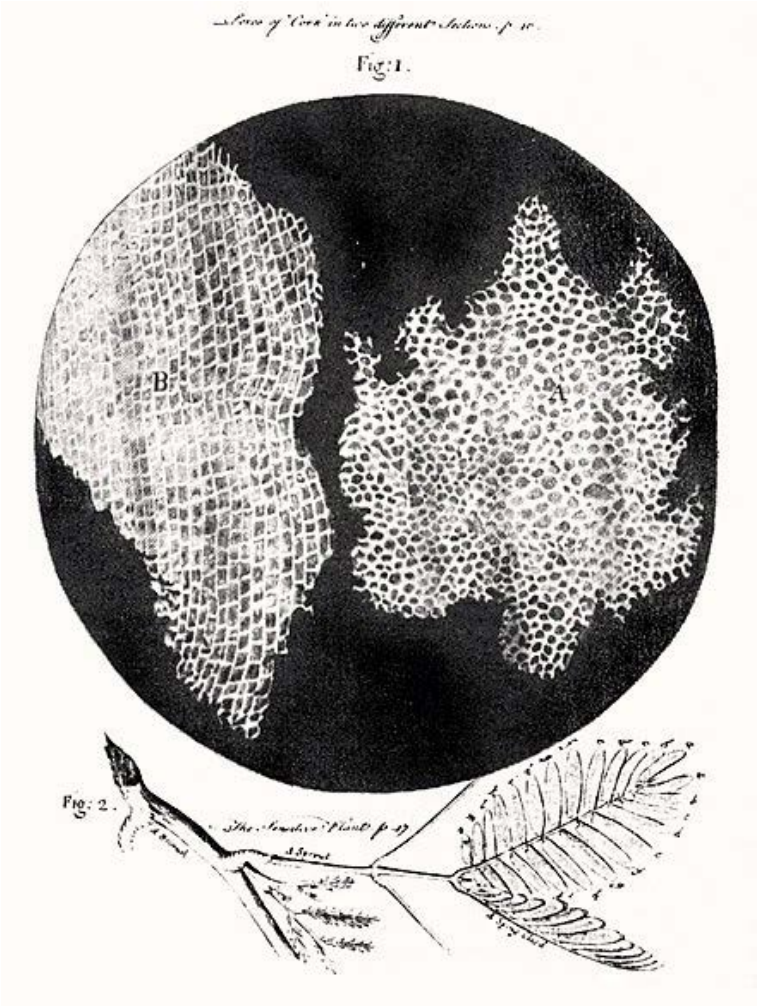
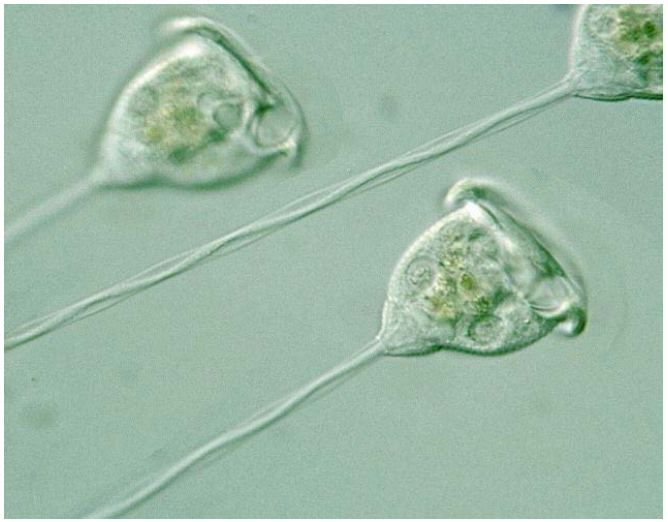
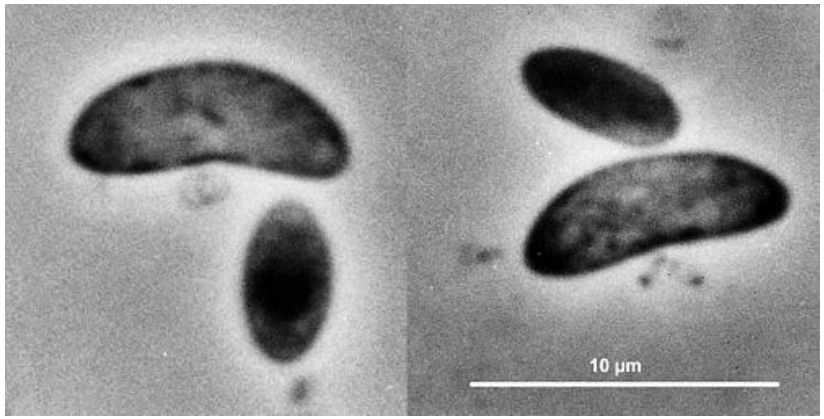
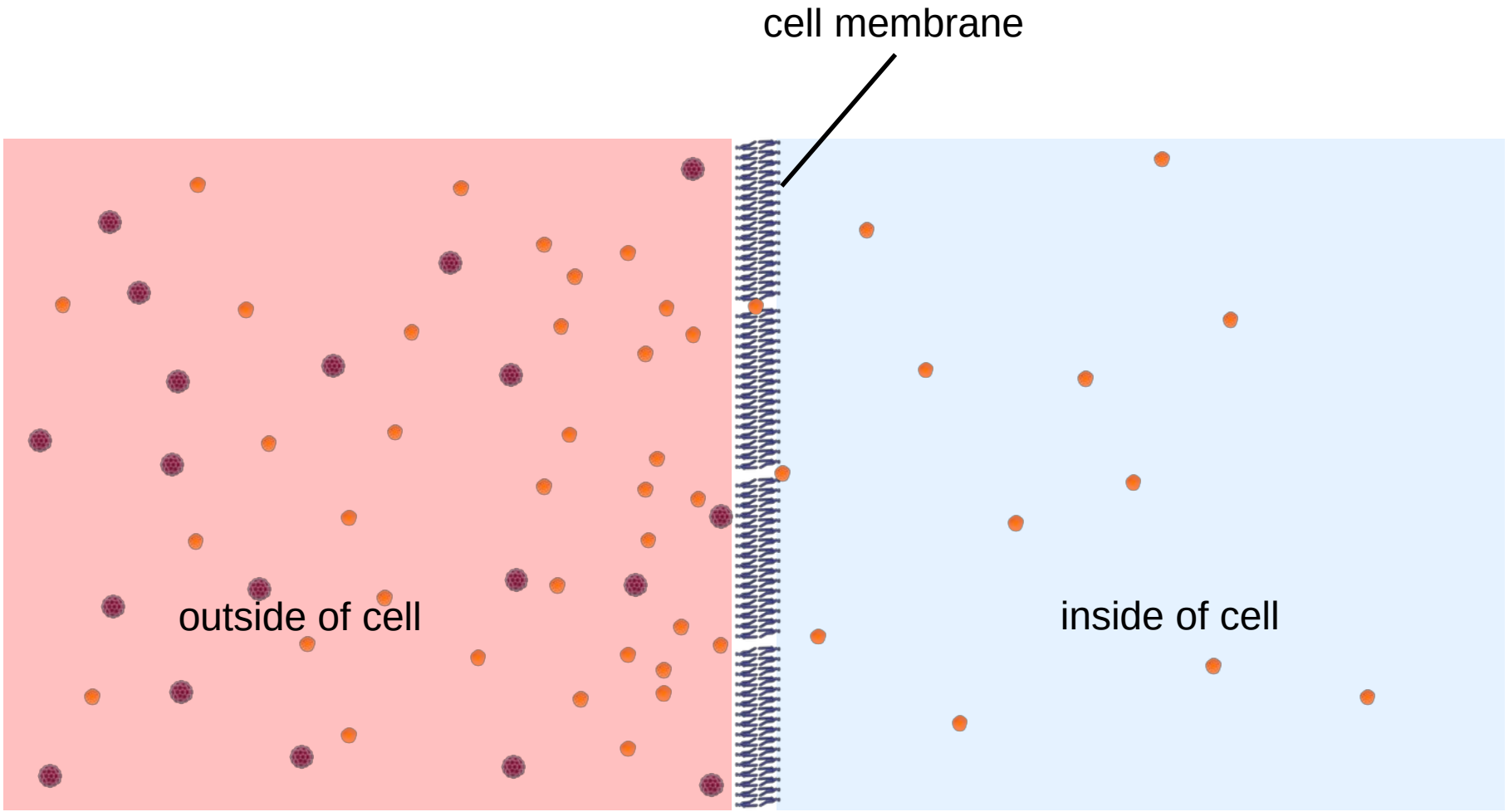
Cells



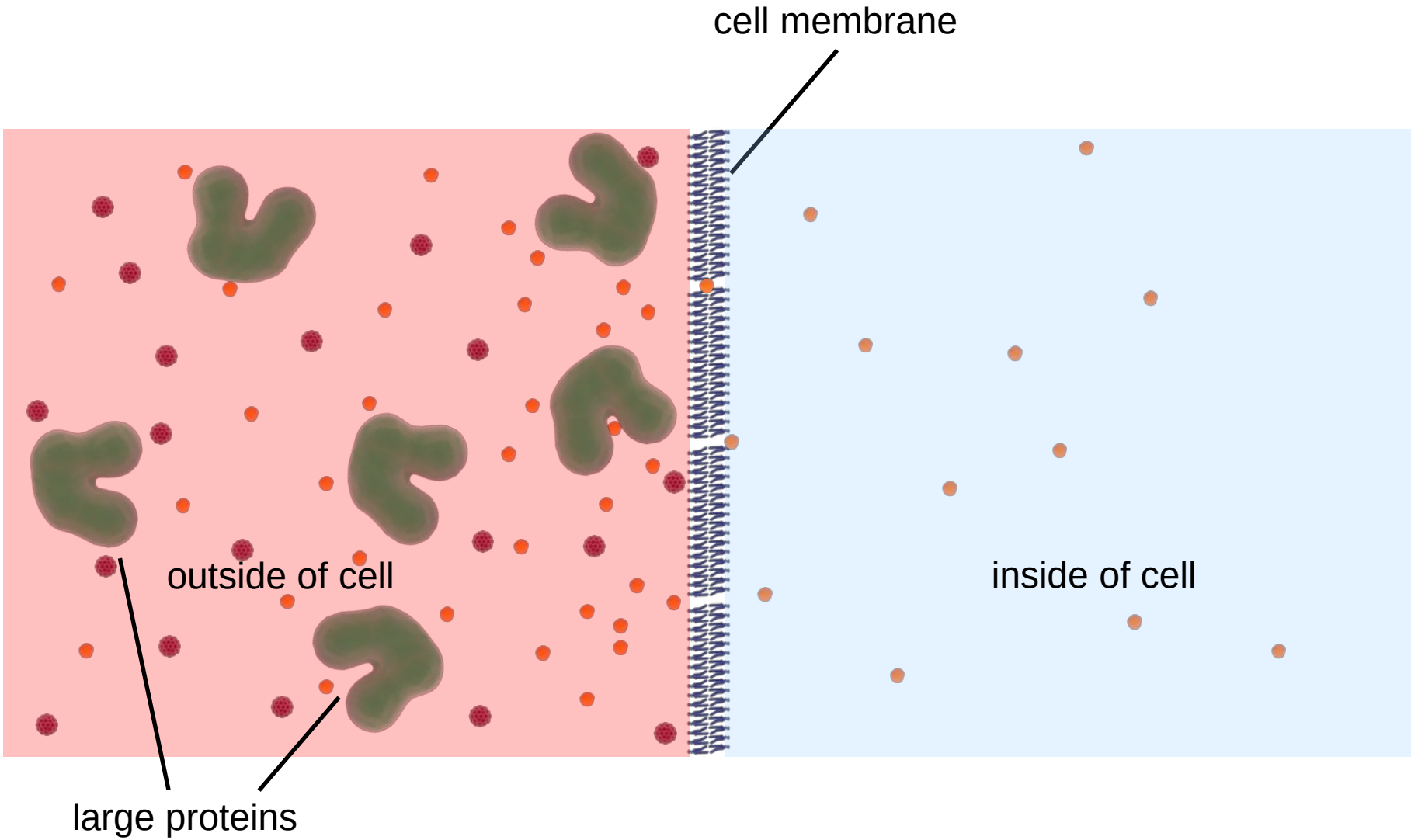




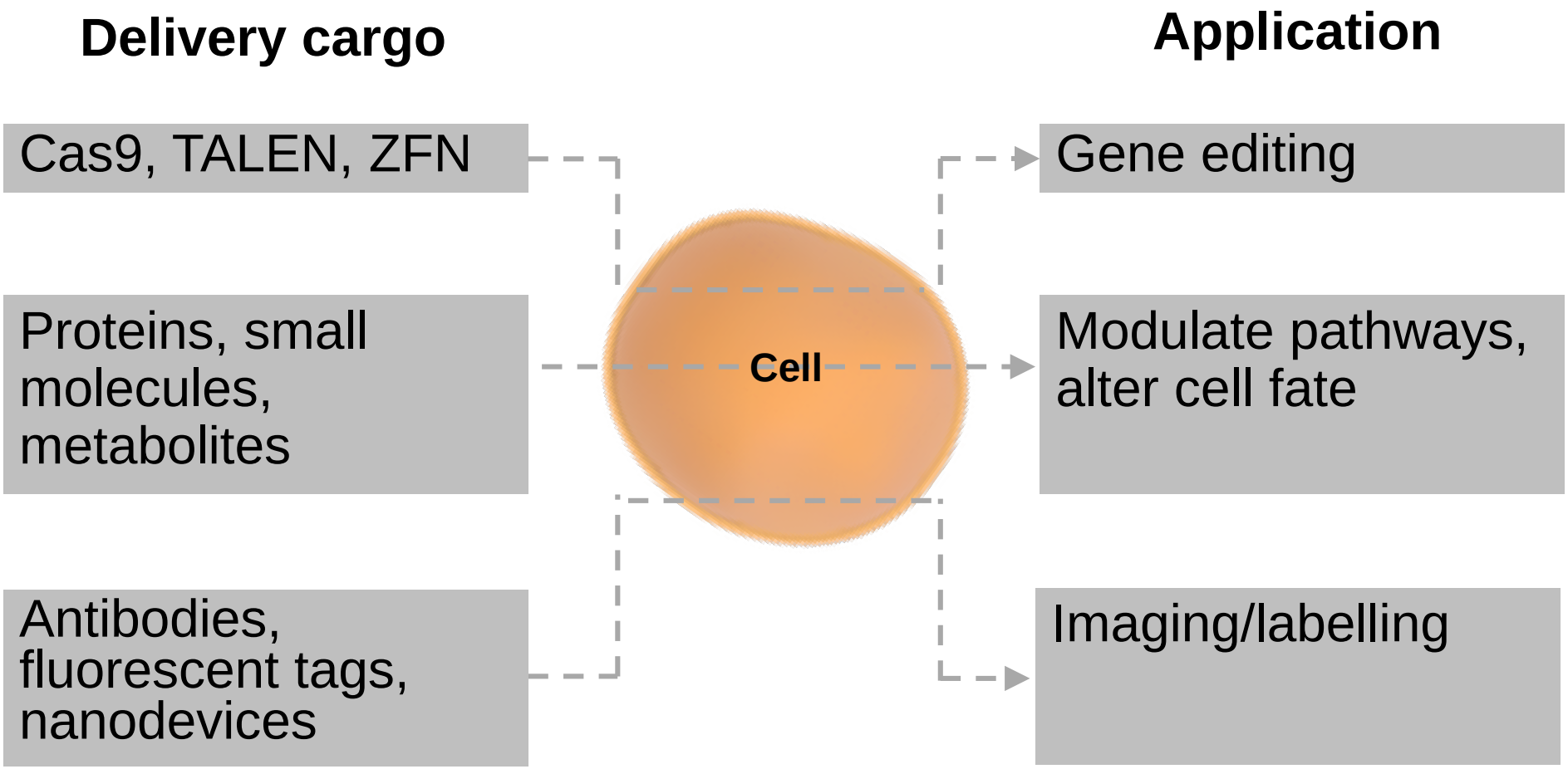
Cell membranes are selectively permeable



Larger cargoes, such as proteins, cannot enter due to their size

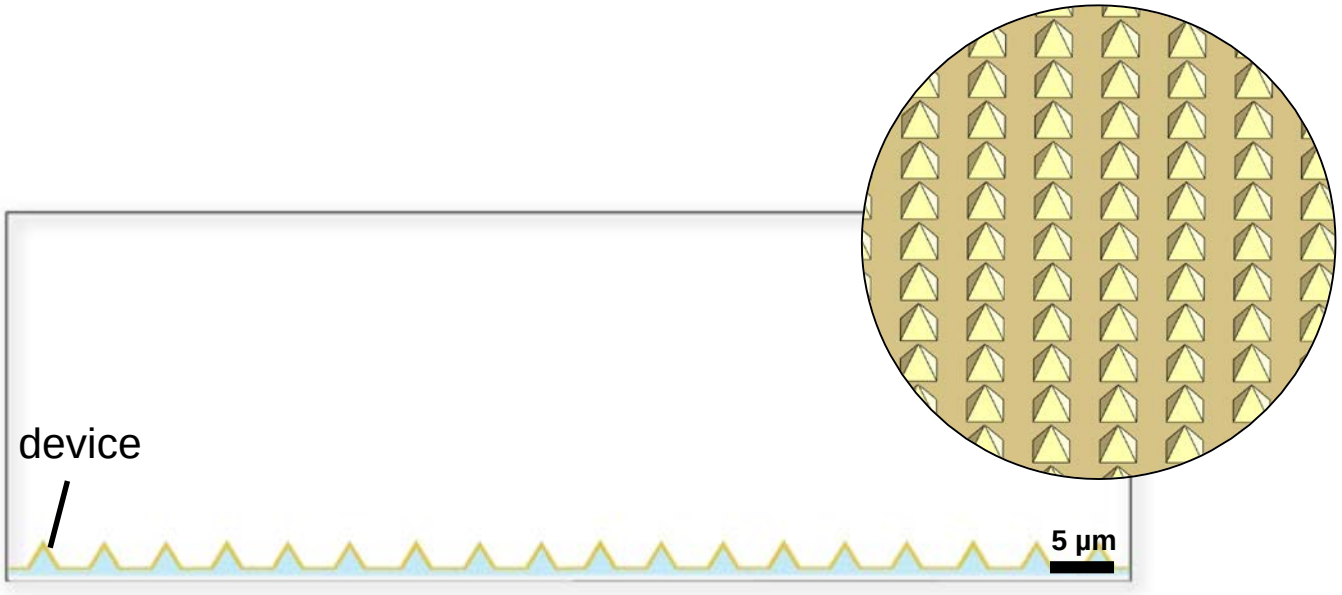


Applications of intracellular delivery



(Madrid; 2018)

How it works



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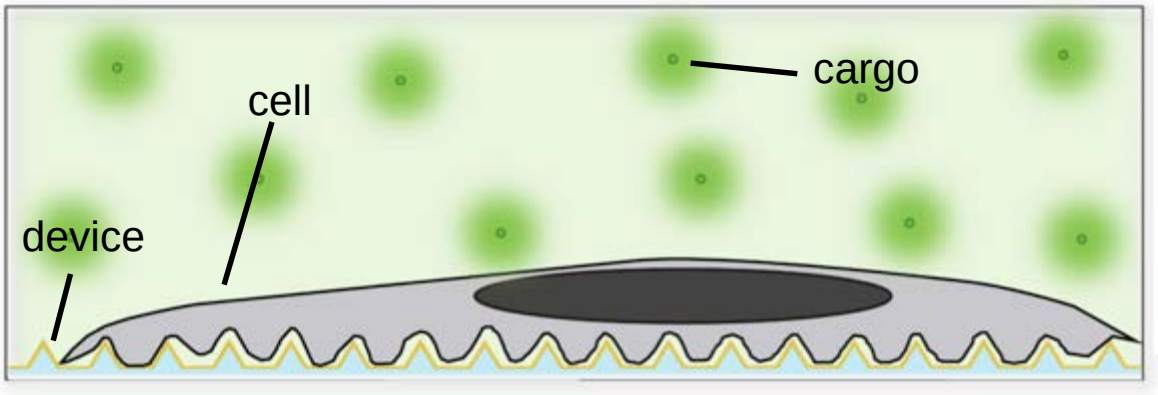

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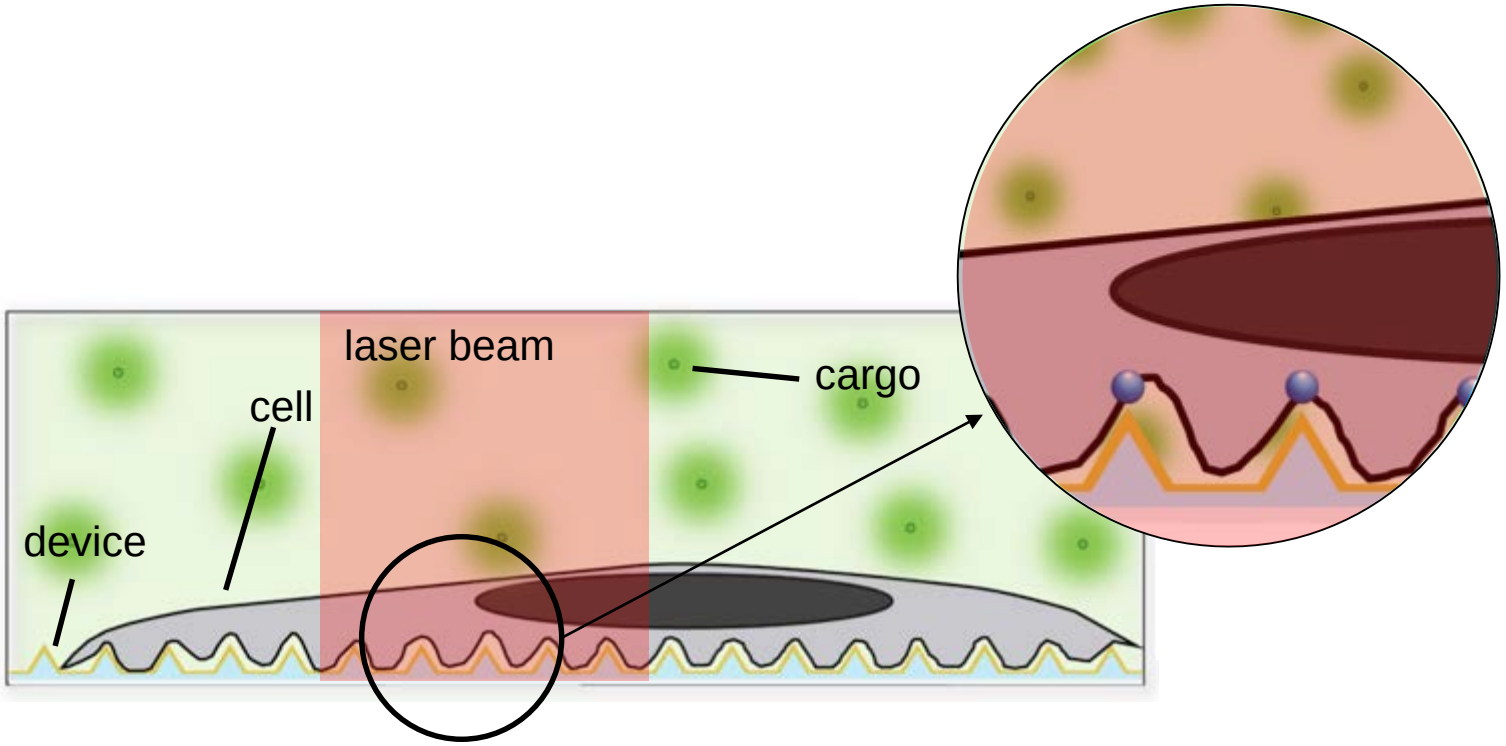

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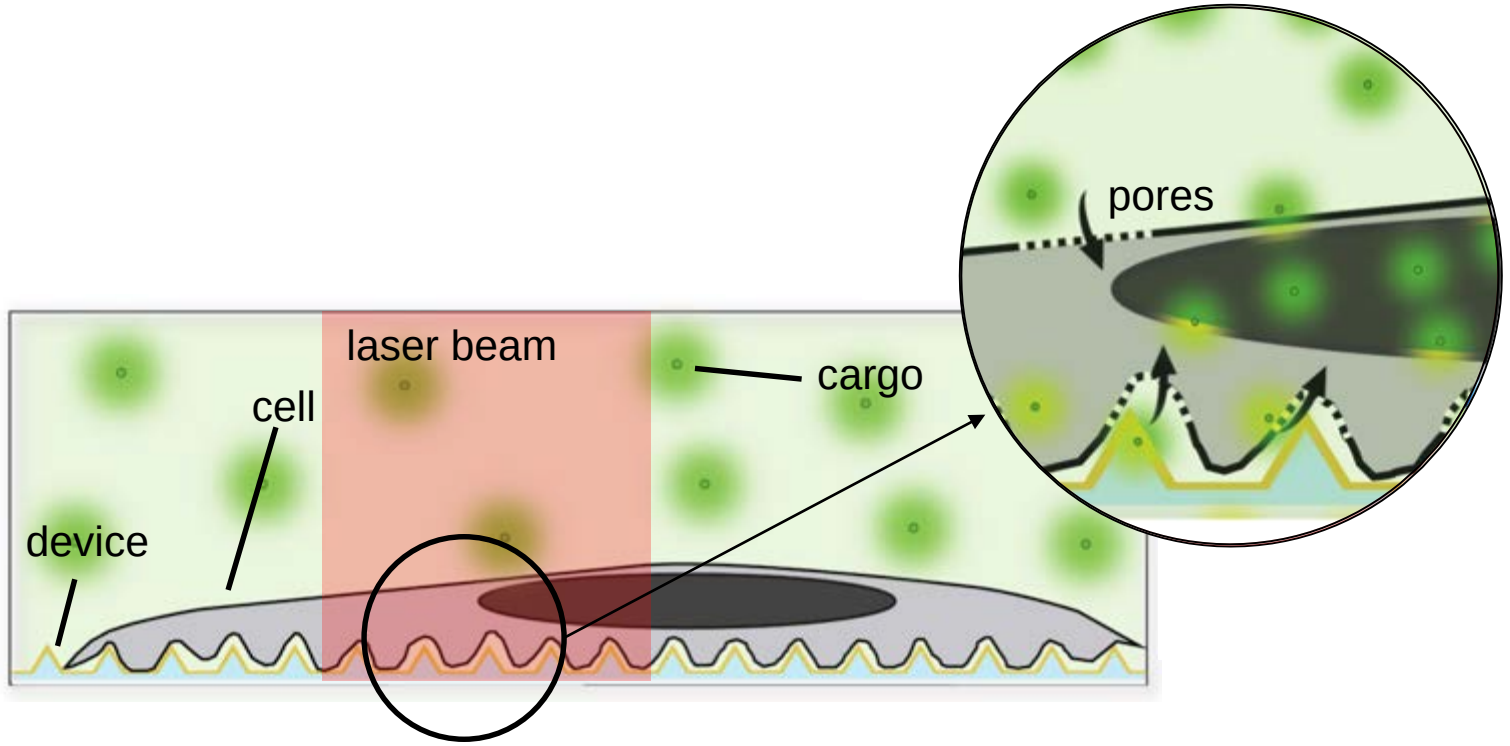
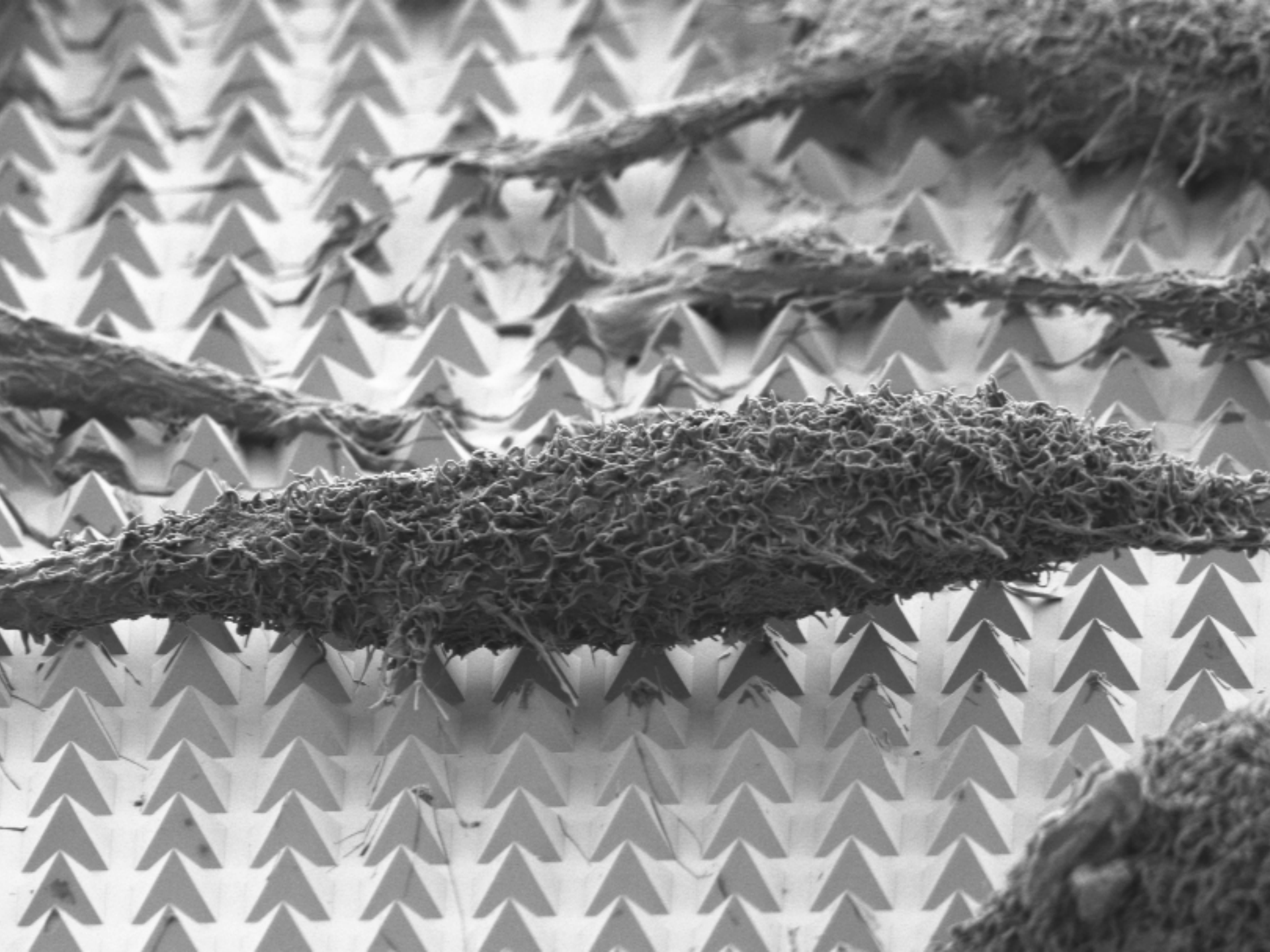
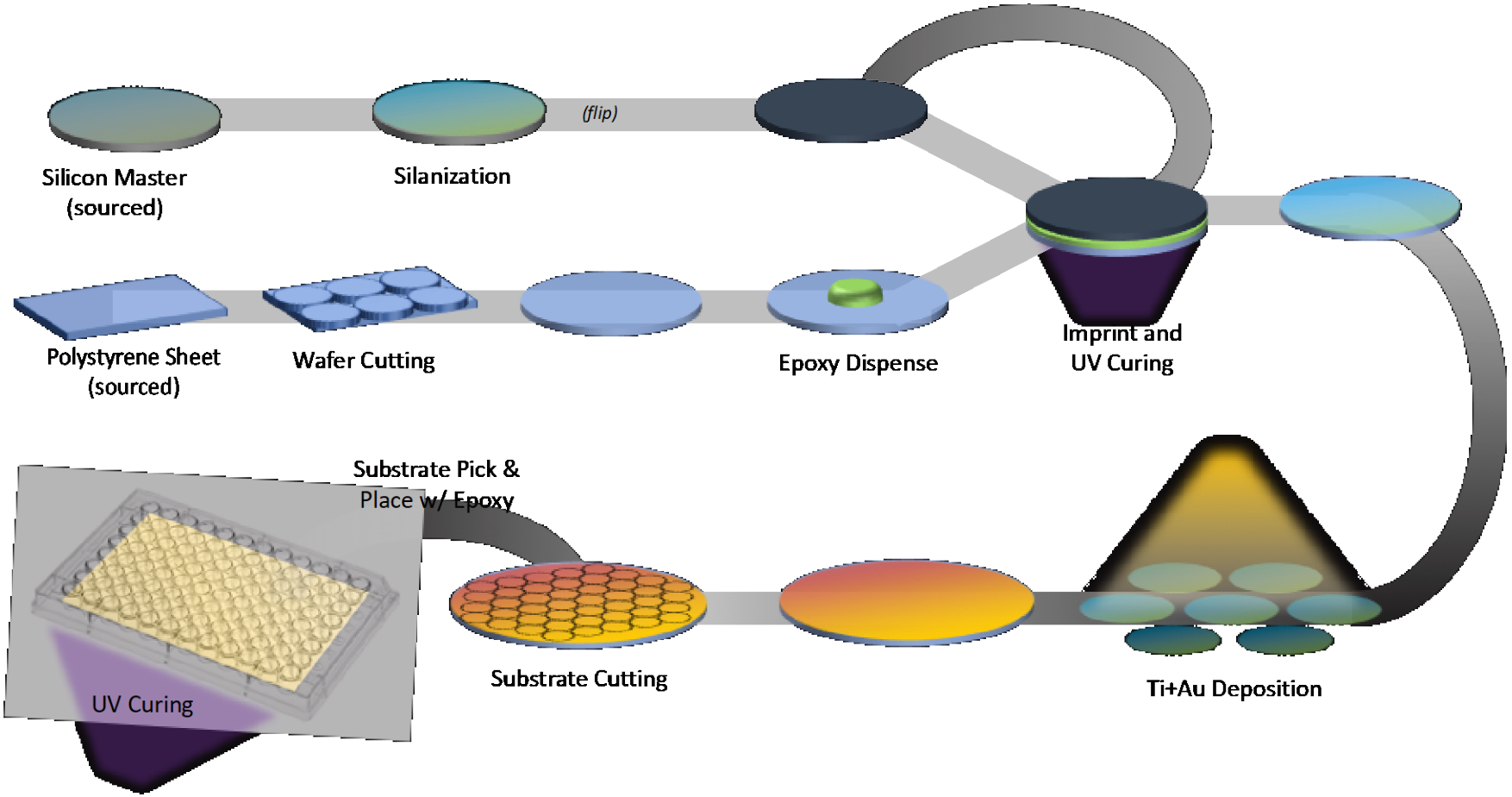


(Saklayen; 2017)



Fabrication process



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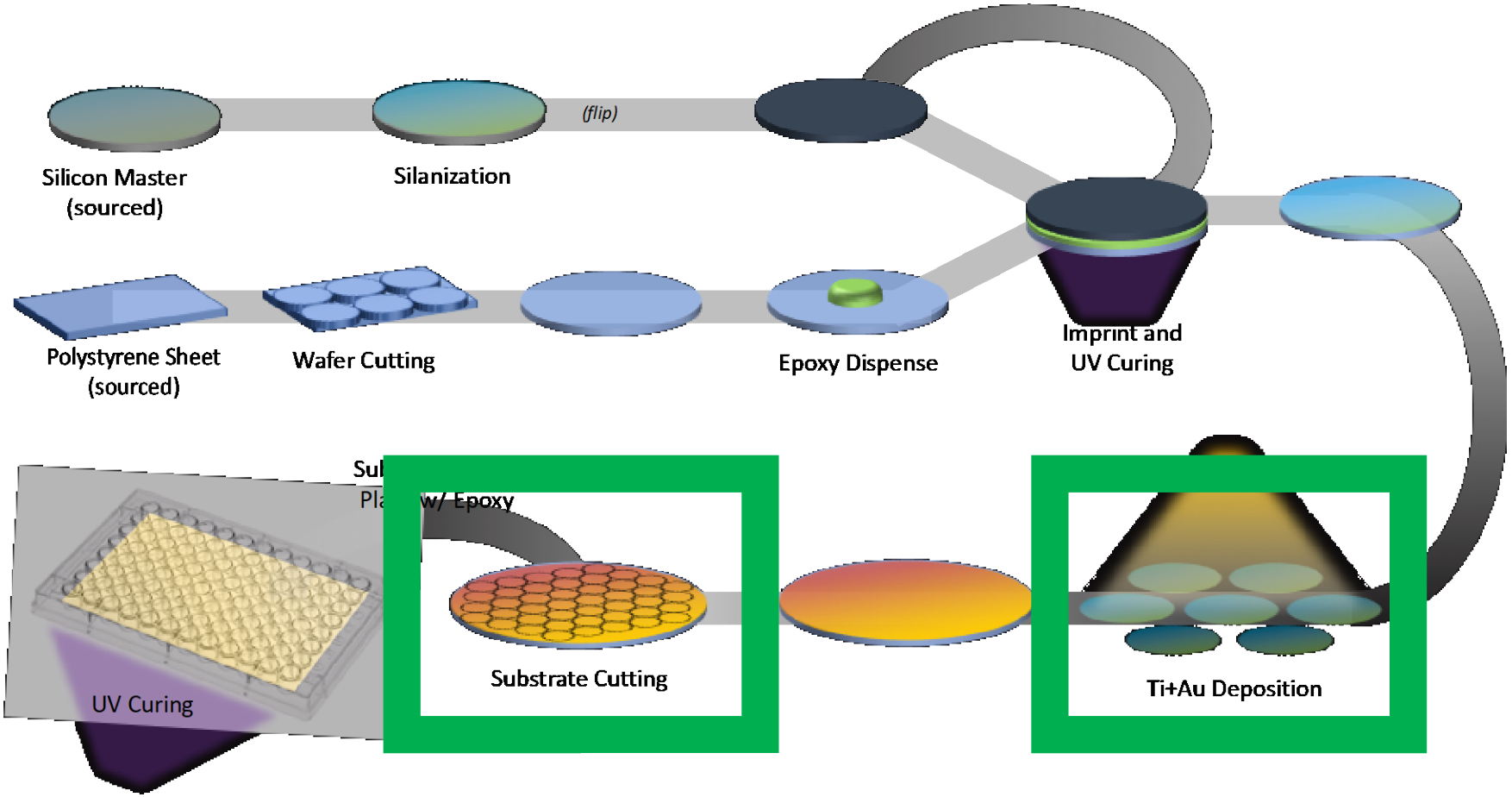
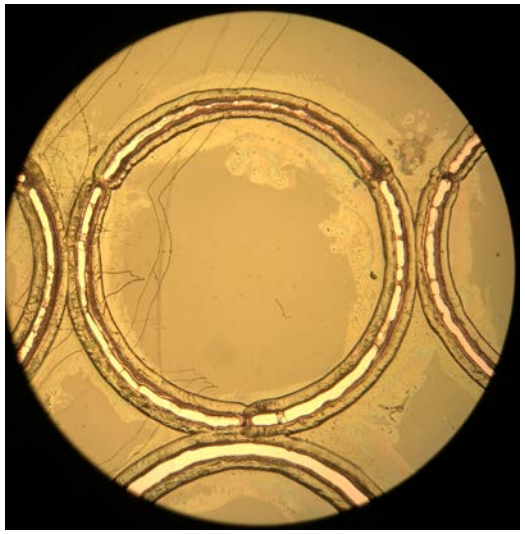
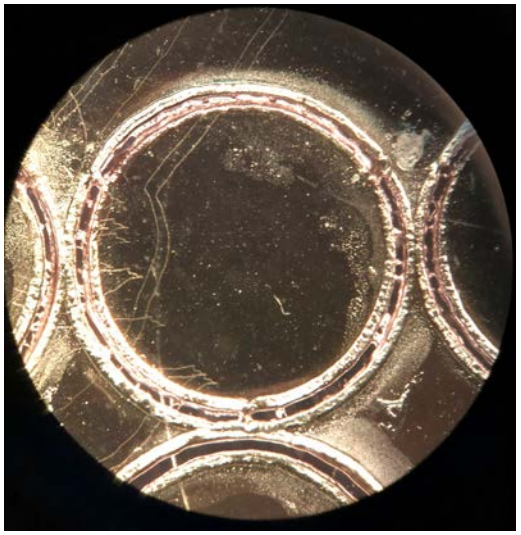


Problem and Developed Solution
Laser-cutting using a water-soluble medium

Problem:
Laser-cutting caused substrate heat damage, burning off pyramids





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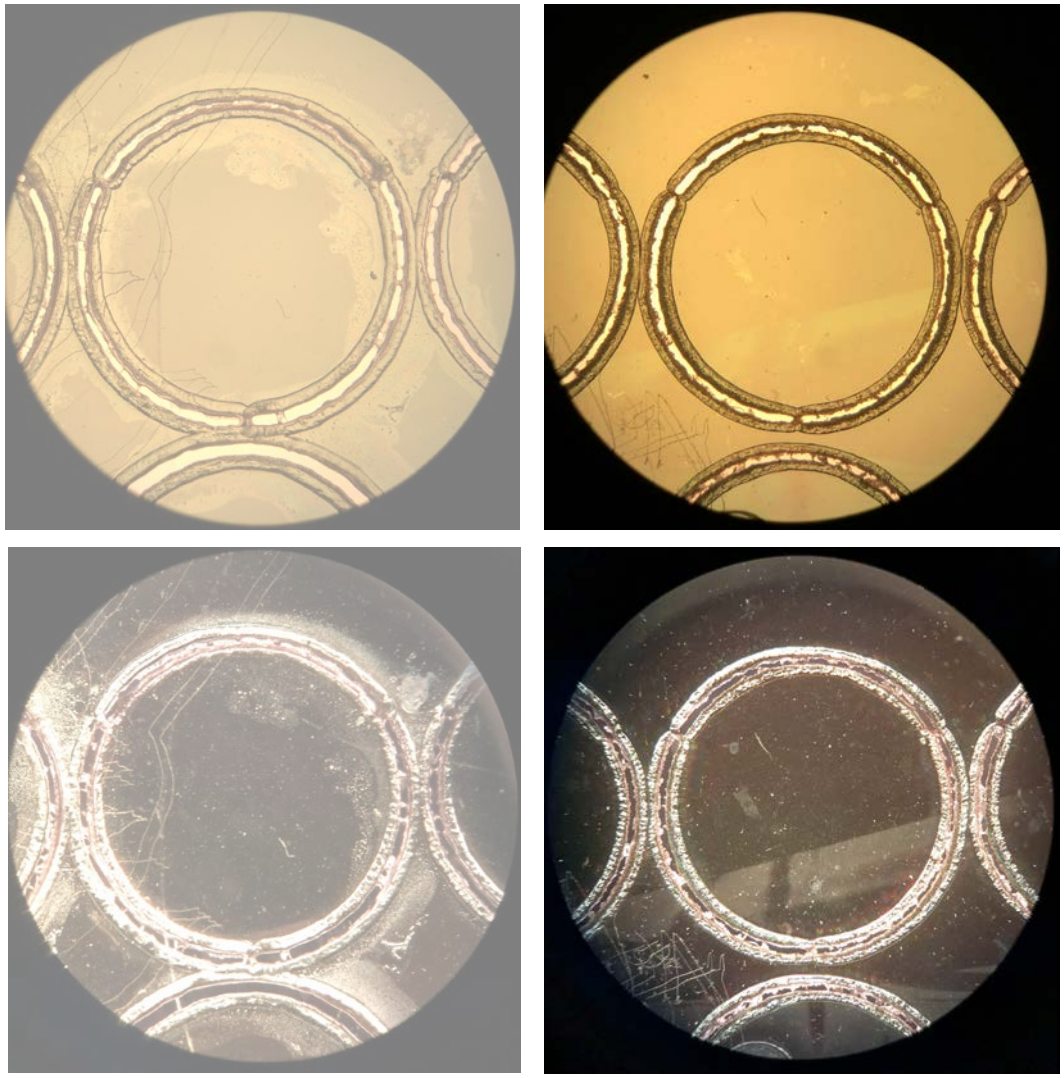

Solution:
A water-soluble, viscous medium used to shield the substrate pyramids

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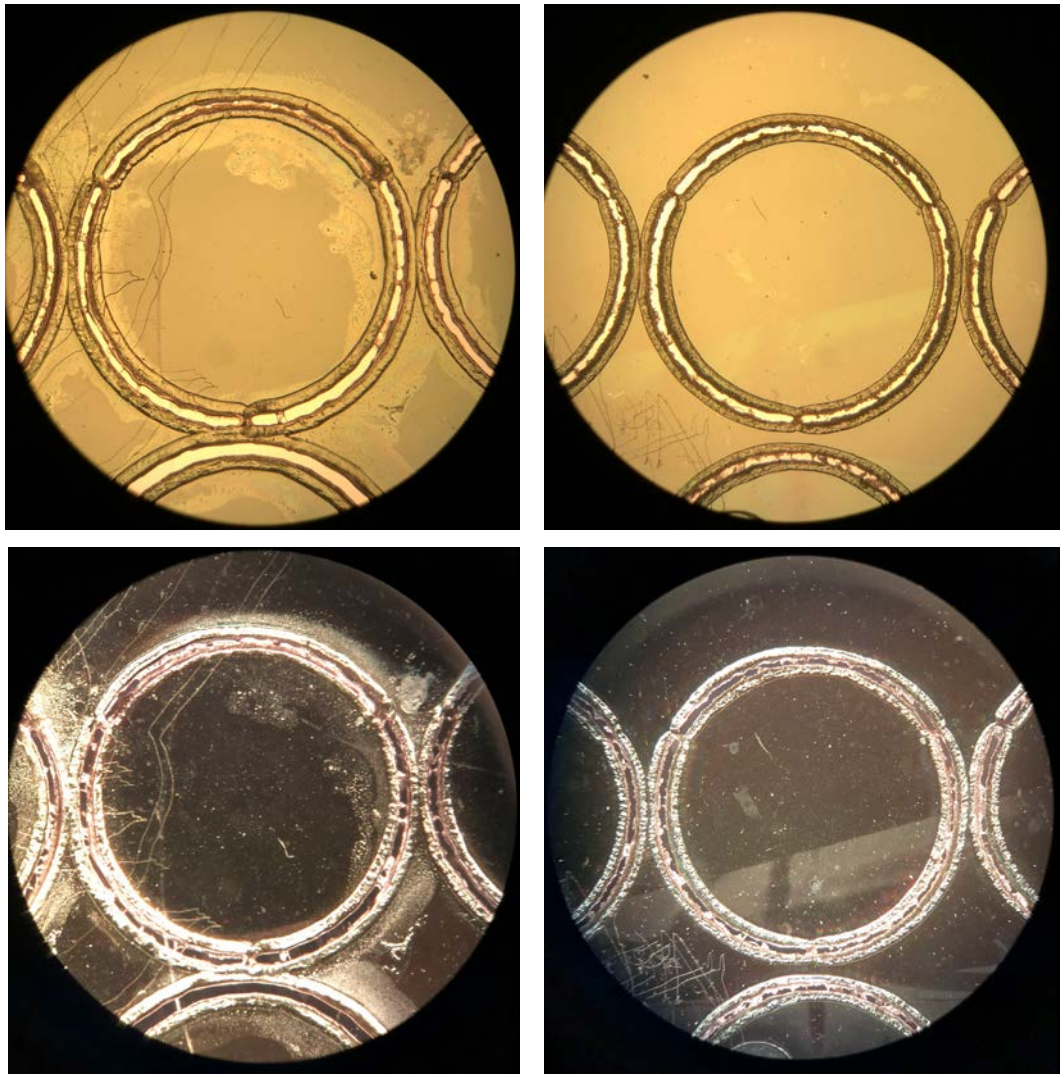

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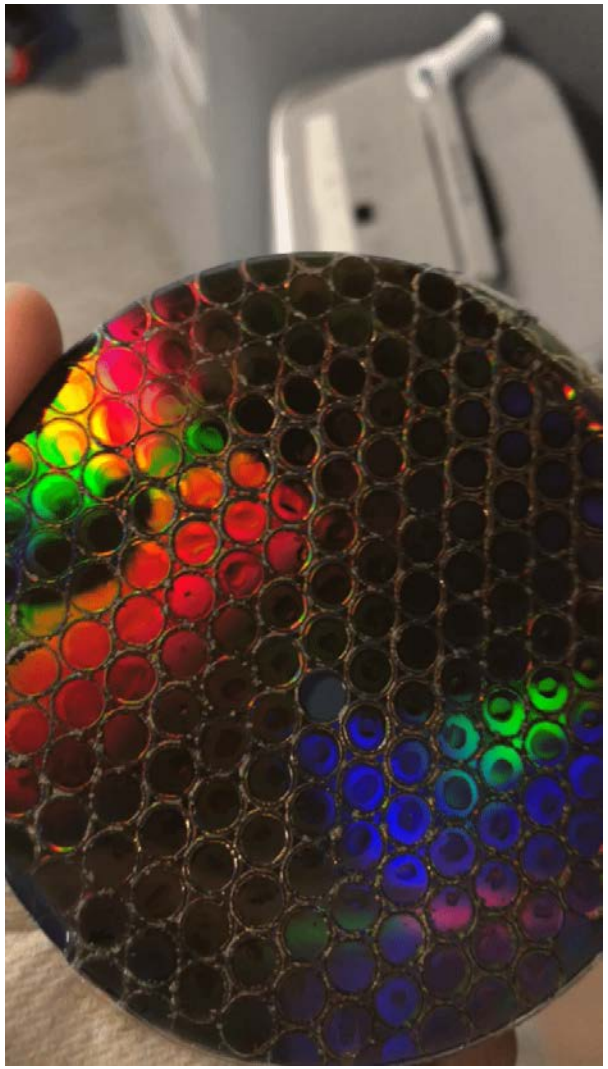
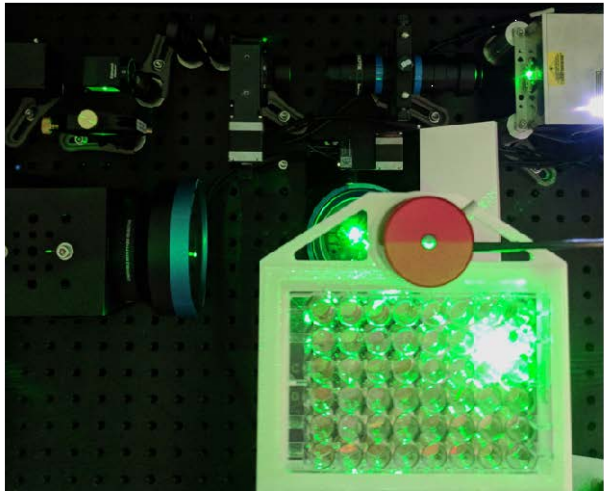
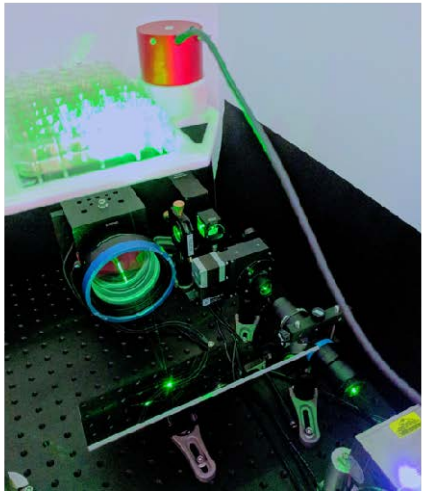
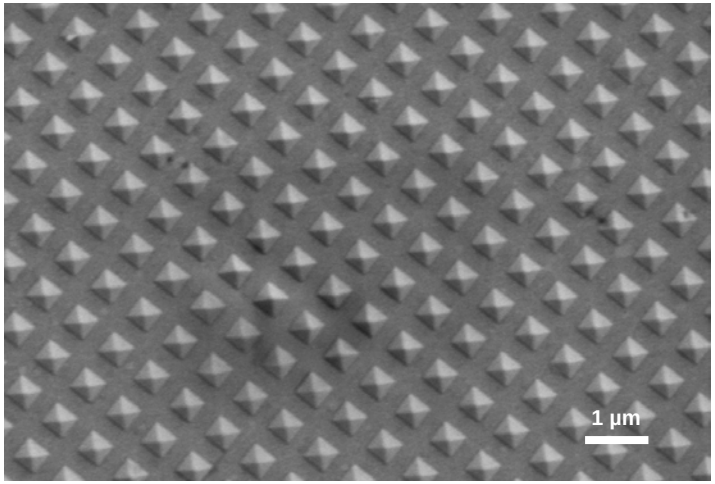
Substrate wafer post-cutting



Cellino Biotech, Inc.
NanoLaze™ technology





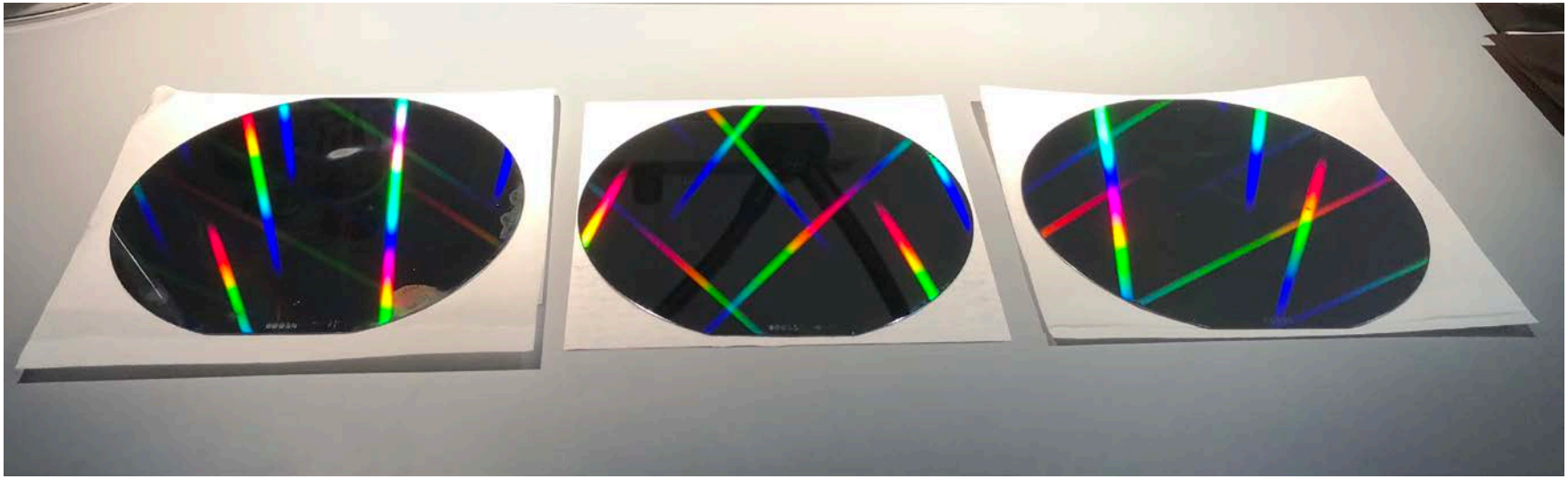


- Top-down and sideview of the system

- SEM of substrate showing pyramids

Conclusion

- Optimization of substrate fabrication achieved
- Next steps:
  - Optimize substrate curing process for a higher intracellular cargo delivery percentage
  - Develop and implement a freezing and thawing method to deliver cells to the ISS



Acknowledgments

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