

# *Single-Cell Genomics:*

## A Stepping Stone for Future Immunology Discoveries

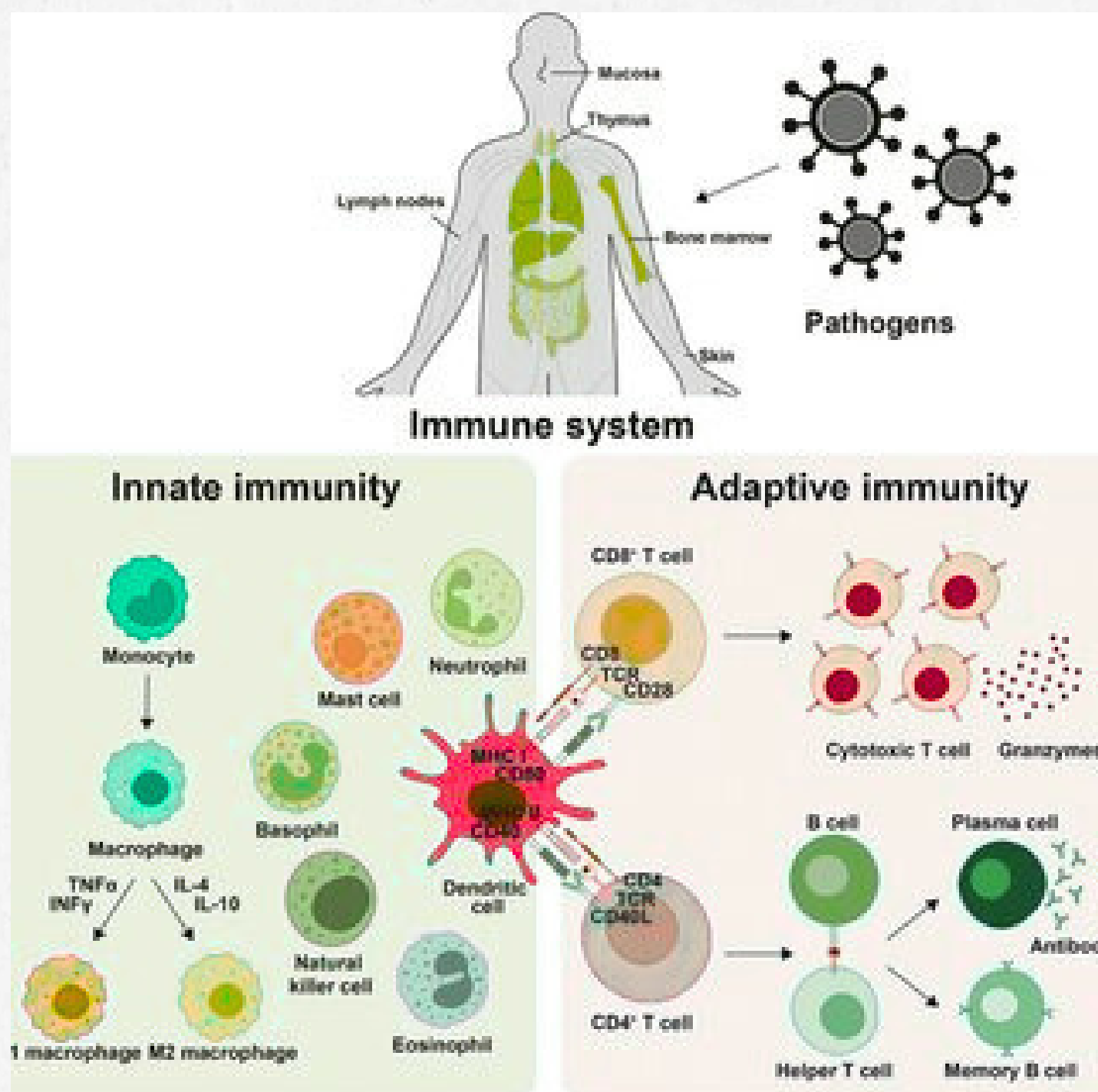
HOW ONE CELL AT A TIME IS RESHAPING THE  
FUTURE OF IMMUNE RESEARCH

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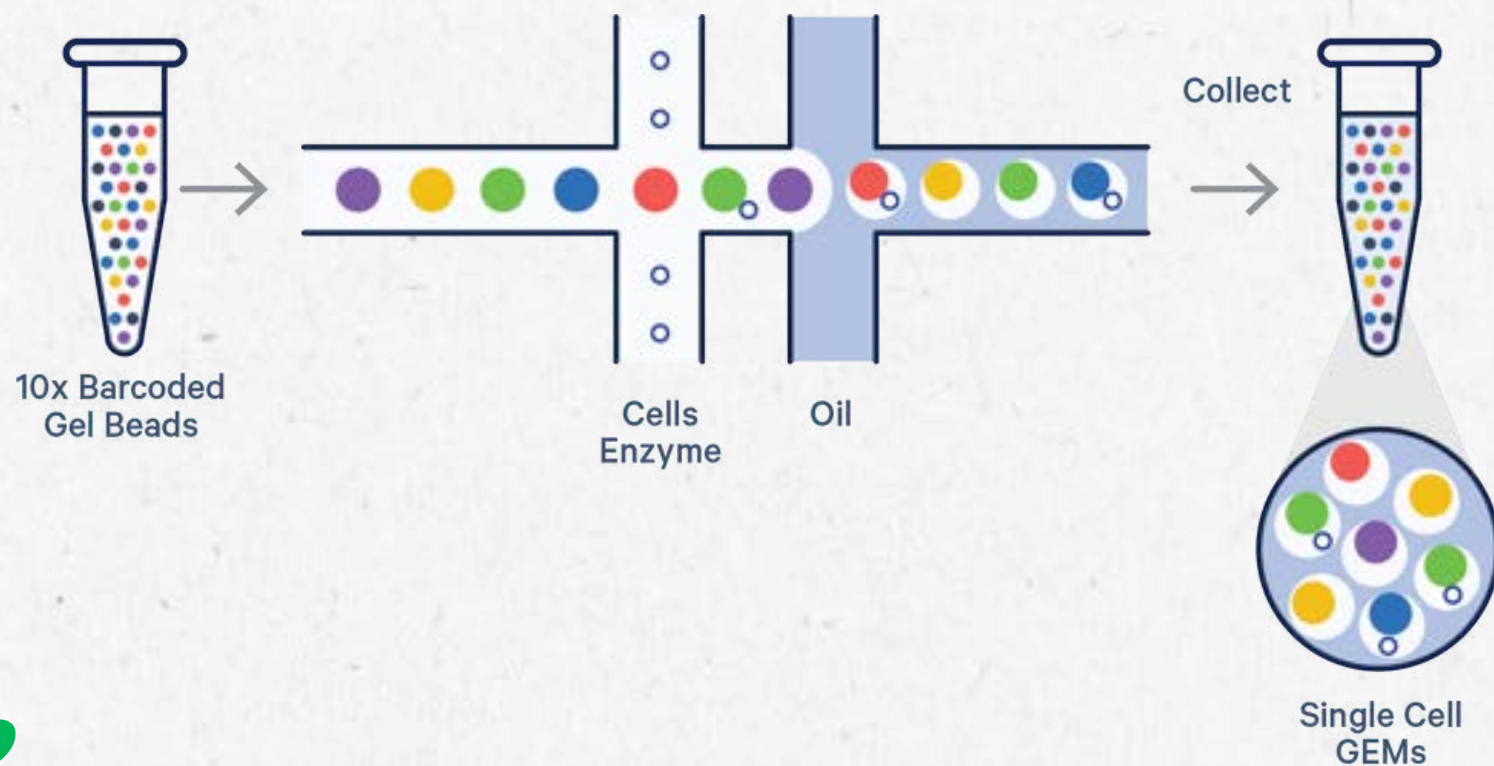
# Why Immunology Needed an Upgrade

- For decades, scientists classified immune cells using fixed molecular markers – helpful, but limited.
- The immune system isn't static. Its cells adapt, switch roles, and behave differently across tissues and diseases.





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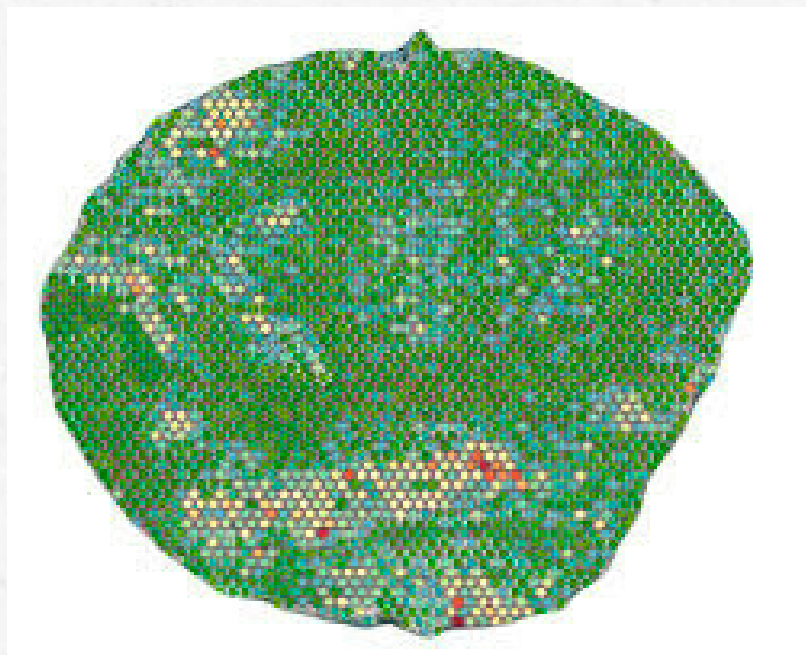


# *The Breakthrough:* Single-Cell Genomics

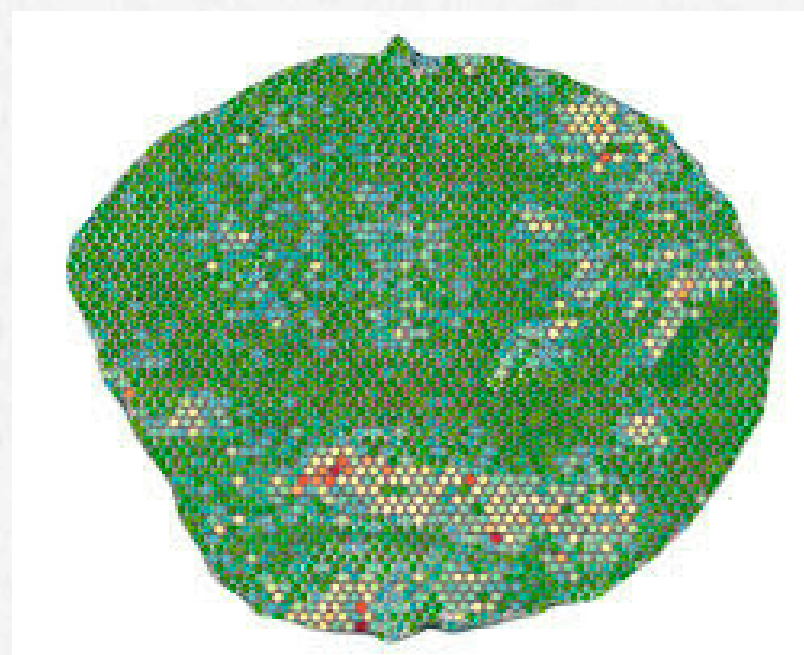
- With single-cell RNA sequencing (scRNA-seq), scientists can now study each cell's gene expression individually. It transforms tissues into cellular maps, exposing unique functions, states, and lineages.
- This unveils hidden cell types, states, and transitions that bulk sequencing once blurred.



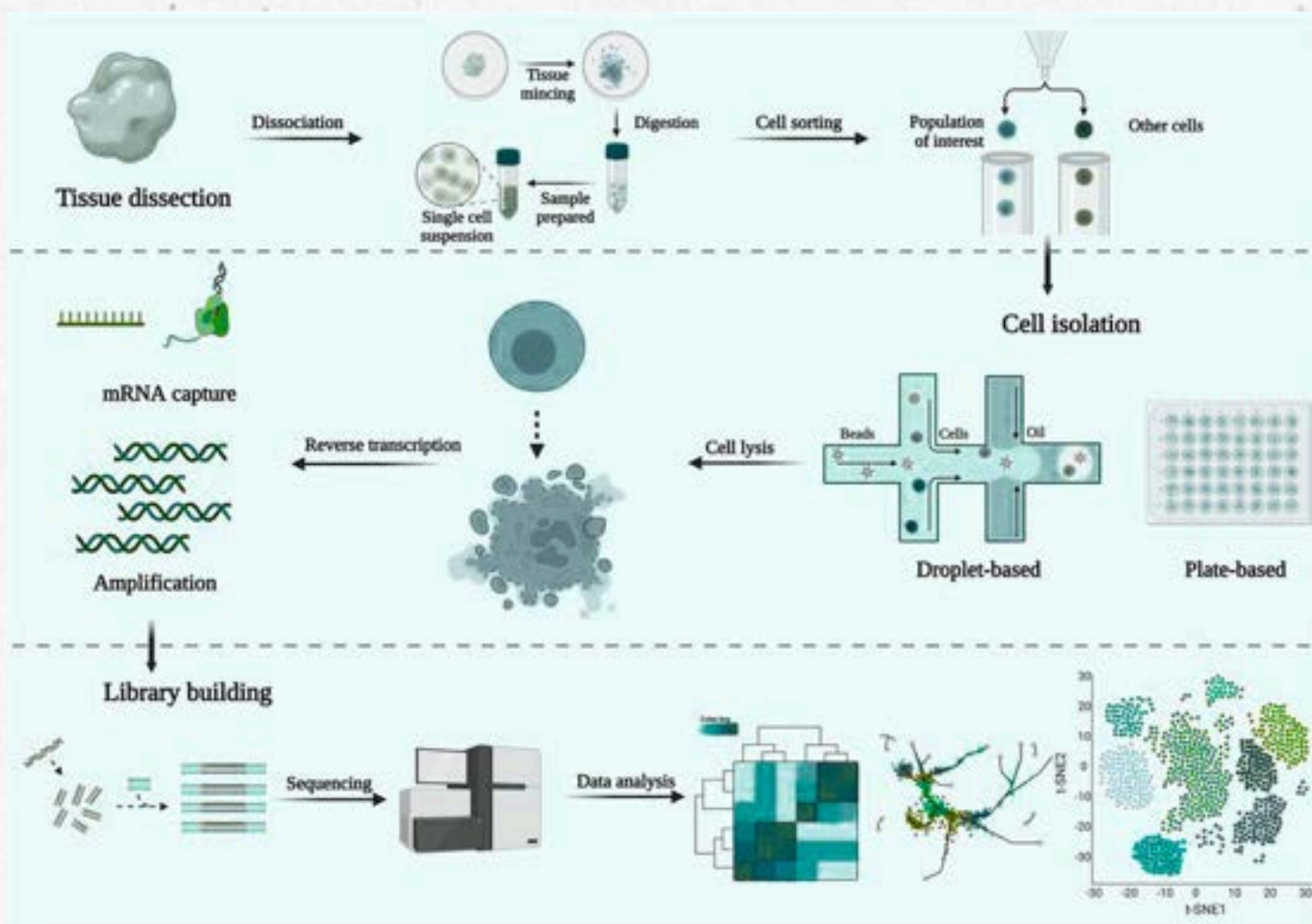
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# *Discoveries That Changed the Game*



# Redefining immune diversity



Thanks to scRNA-seq, we've discovered:

- Disease-associated microglia in Alzheimer's
- New T-helper and innate lymphoid subsets
- Dynamic immune cell responses during infection



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# *“From microfluidics to machine learning”*

The following advances have boosted throughput, accuracy, and discovery speed:

- Microfluidic droplet systems
- Molecular barcoding
- Computational clustering

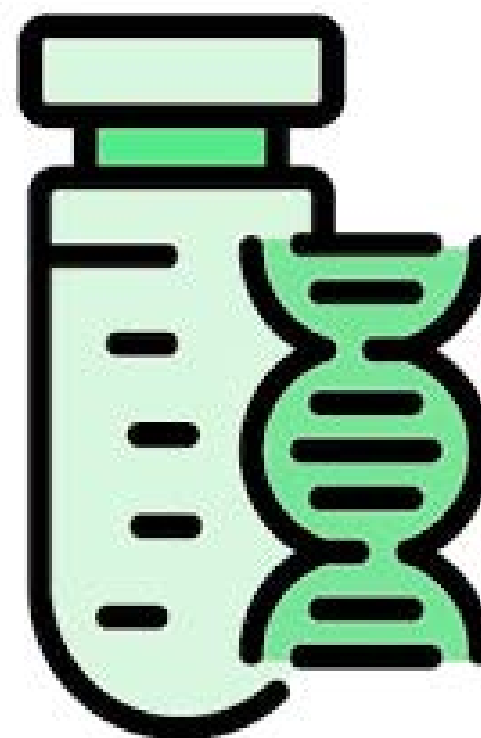


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# The Future

Bridging Discovery and Therapy



# From Data to Cures

Single-cell genomics is not just a discovery tool – it's shaping:

- Immunotherapy design
- Biomarker identification
- Personalized medicine

*Every cell has a  
story*

and together, they tell  
the future of  
immunology.



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