MEDICAL BIOTECHNOLOGY

Exploring New Avenues for Health

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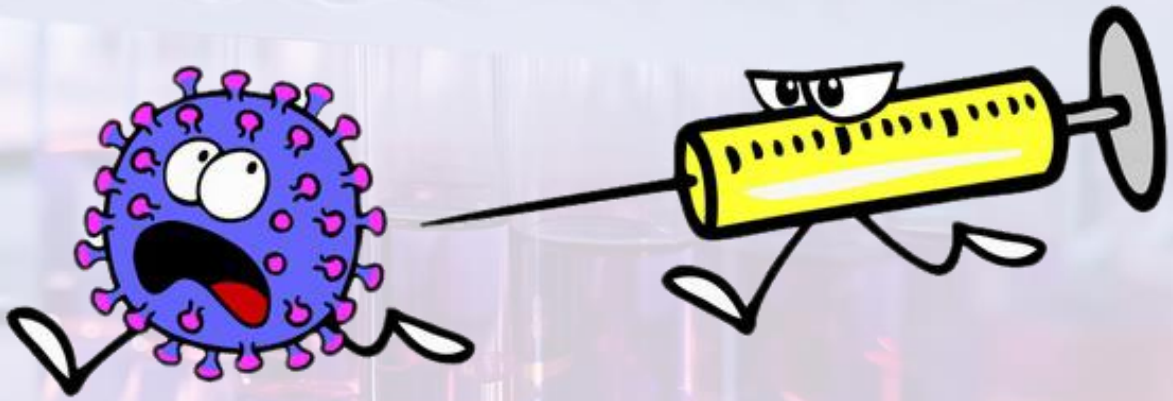
- Medical biotechnology uses living cells and cell materials to produce pharmaceuticals and diagnostic products that help treat humans.
- Some new advances in medical biotechnology are,
  - CAR-T cell therapy
  - CRISPR technology
  - mRNA vaccination
  - Regulative medicine
  - Gene therapy
  - Organoids

mRNA Vaccination

- Use mRNA to instruct cells to produce proteins that triggers the immune response
- Directly teach the immune system to recognize and fight specific pathogens

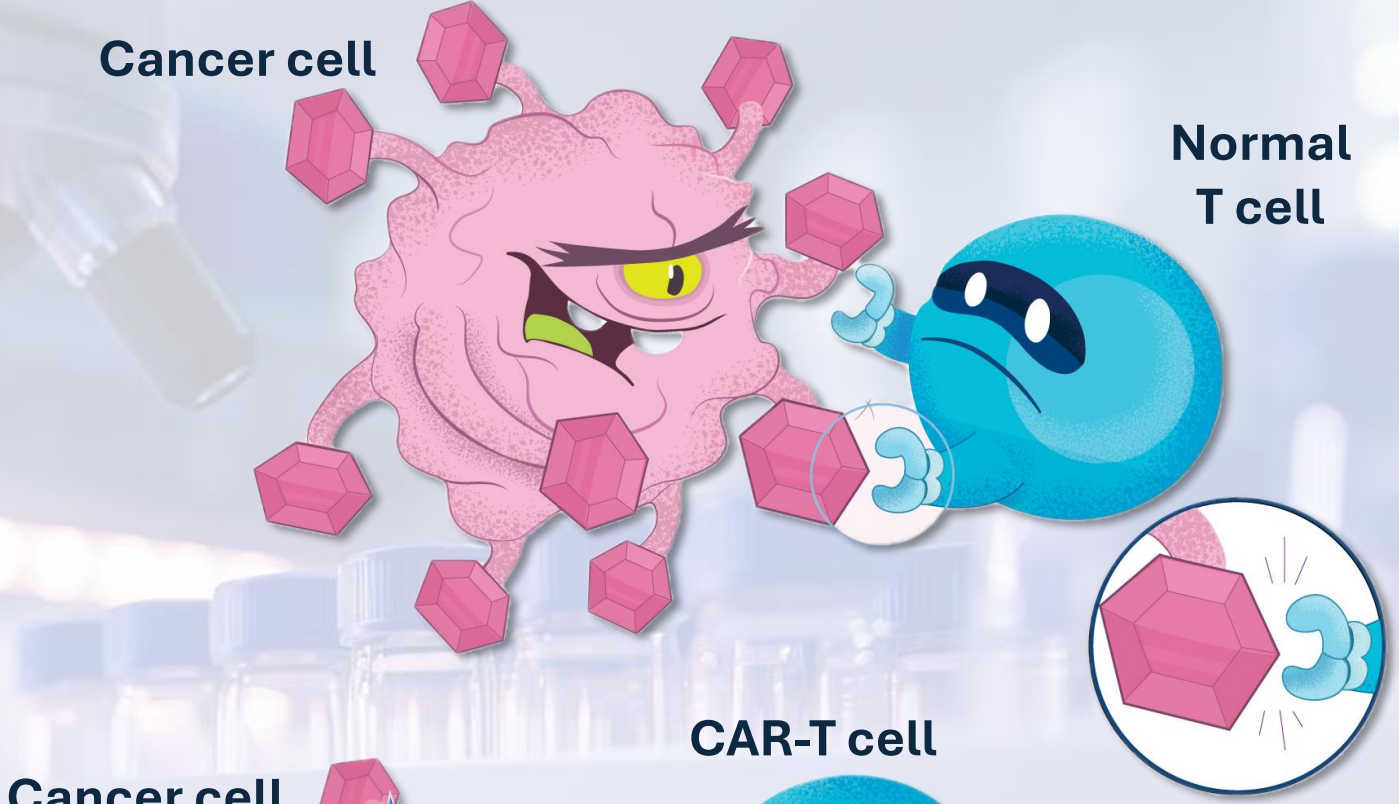


CRISPR Technology

- Allows scientists to make precise changes to DNA
- Cut specific parts of the genome to either correct or replace the targeted sequence

CAR-T Cell Therapy

- Modify T-cells to recognize and attack cancer cells
  - ➢Leukemia
  - ➢Lymphoma

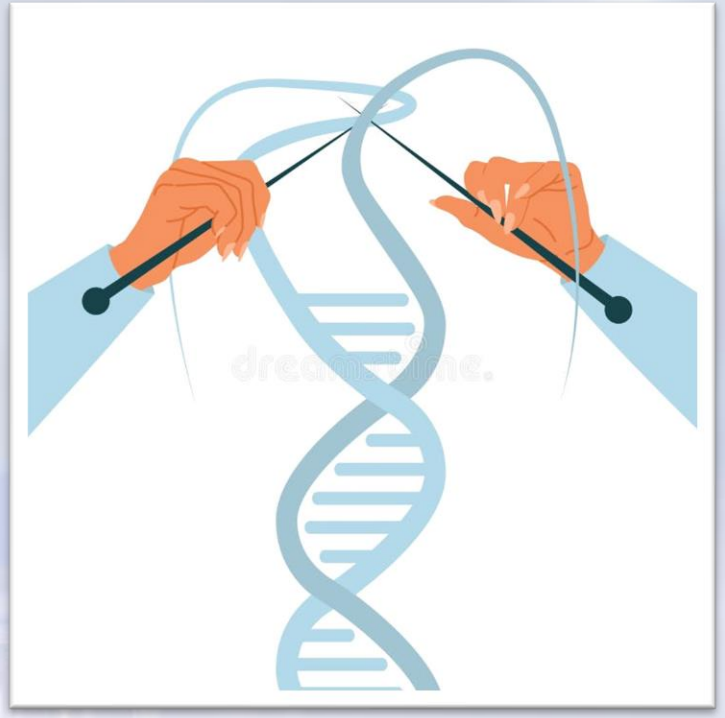


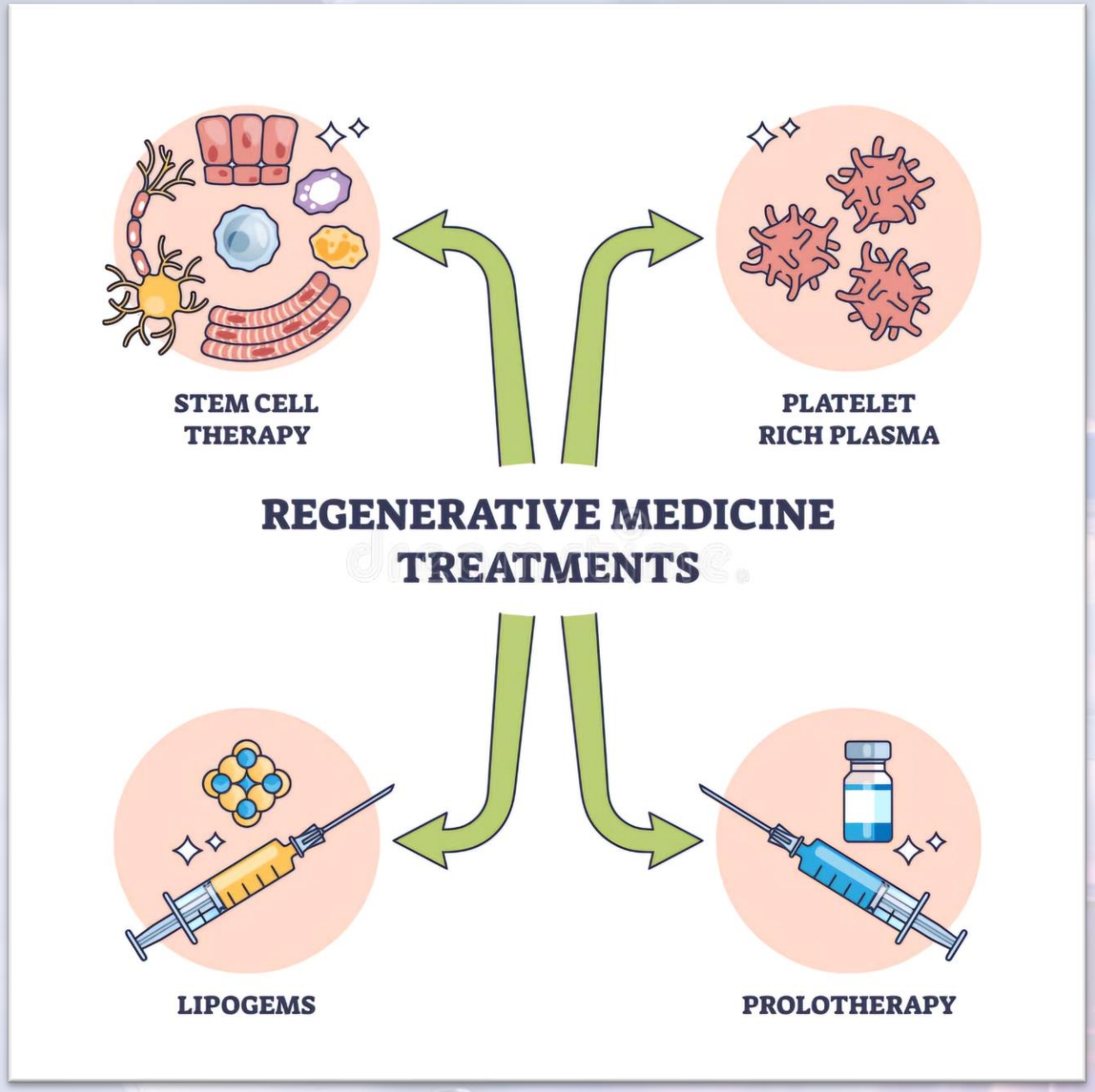
Organoids

- Produce miniaturized versions of organs from stem cells
- Advanced understanding of Organ development and Disease progression

Gene Therapy

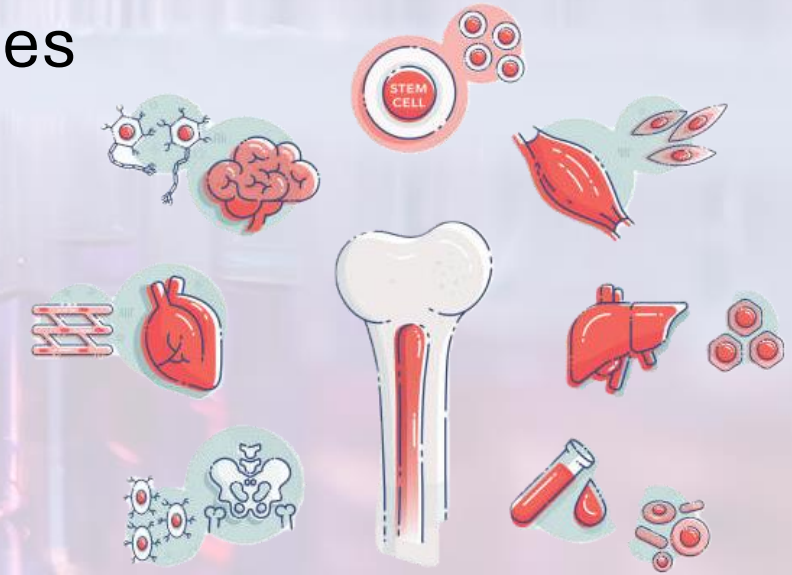
- Replacing a disease
- Inactivating a disease
- Introducing a newly modified gene into the body





Regenerative Medicine

- Stem cell injection
- Platelet rich plasma (PRP)
- Prolotherapy
- Cartilage regeneration techniques

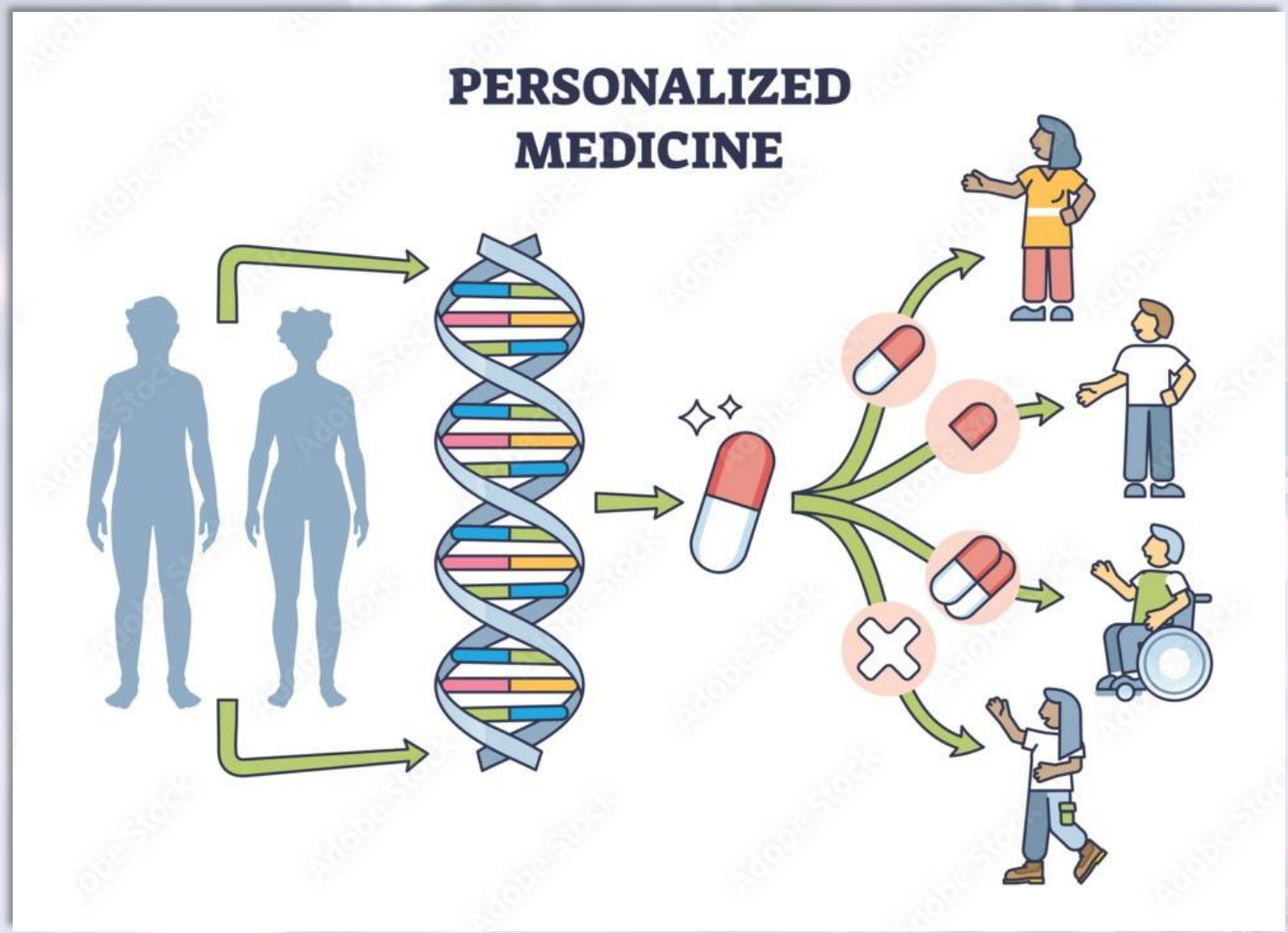


Ethical Considerations and Regulatory Challenges

- Protecting human subjects in clinical trials
- Affordability
- Protecting the privacy of the patient
- Defending the United States against Bioterrorism
- Opposing stem cell research
- High cost may exclude the poor
- Monitoring long-term effects after release

Future Directions & Emerging Trends

- Personalized medicine
- Microbiome Manipulation
- Bio Manufacturing
- Synthetic Biology
- Gene Editing

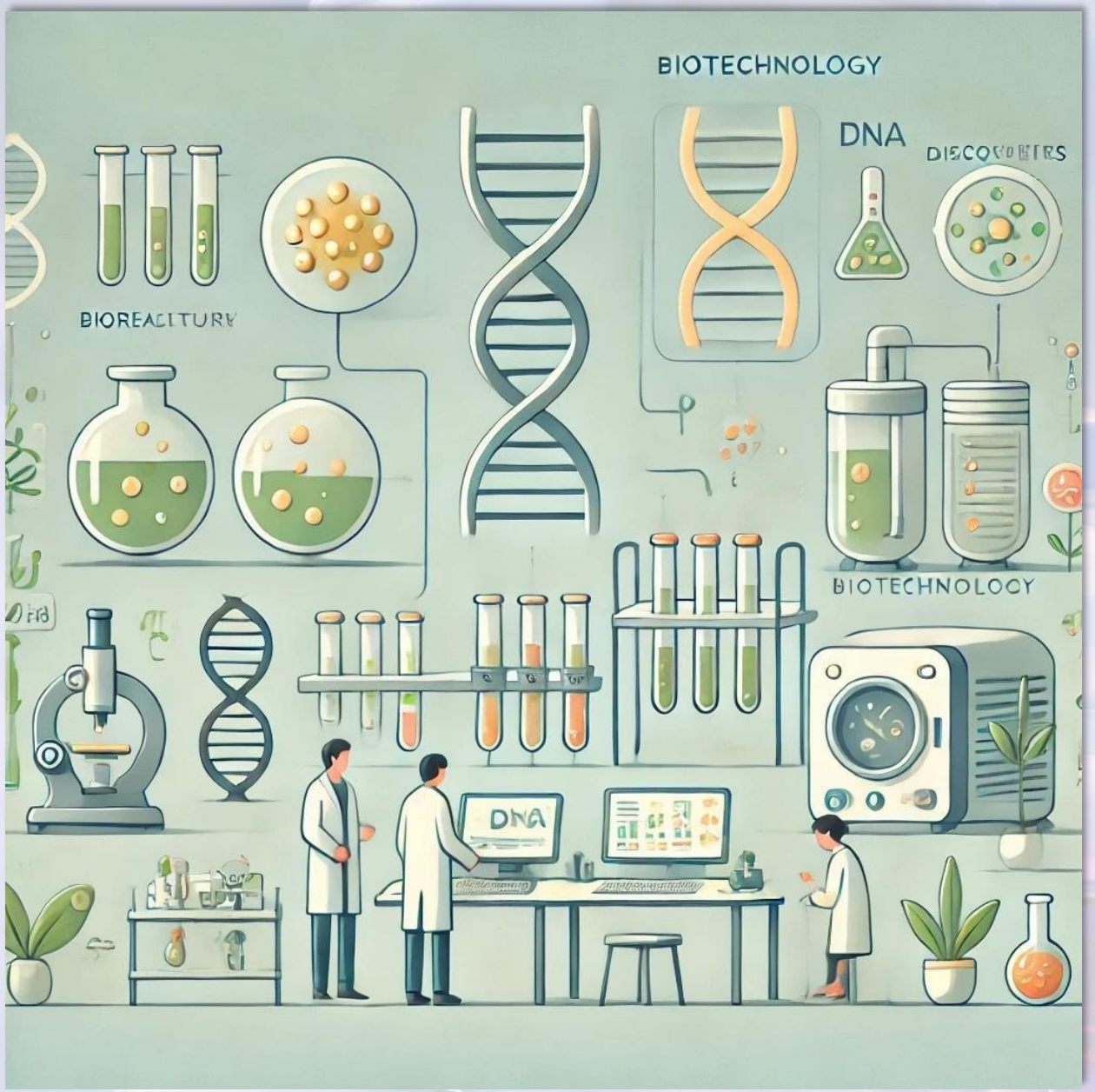


Personalized Medicine

- Provide tailor-made prevention and treatment strategies for defined groups of individuals

Microbiome Manipulation

- Manipulation of gut microbiome to promote health & restore microbiome balance



Bio Manufacturing

- Manufacturing that uses biological systems, to provide commercially relevant molecules

Conclusion

References

- Harvard University. (2020). Organoids: The future of medical research. Retrieved from https://hsci.harvard.edu/organoids
- Ltd, E. M. P. (2022). The Future Trends in Biotechnology | Esco Scientific. Www.escolifesciences.com. https://www.escolifesciences.com/resources/the-future-trends-in-biotechnology
- University of Pennsylvania. (2021). CAR-T cell therapy: Revolutionizing cancer treatment. Retrieved from https://www.pennmedicine.org/cancer/navigating-cancer-care/treatments-and-procedures/car-t-cell-therapy


THANK YOU!