

Genetic modifications and biotechnology

Modul no. 1: Animal Genetics

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Overview

Where did this technology come from?

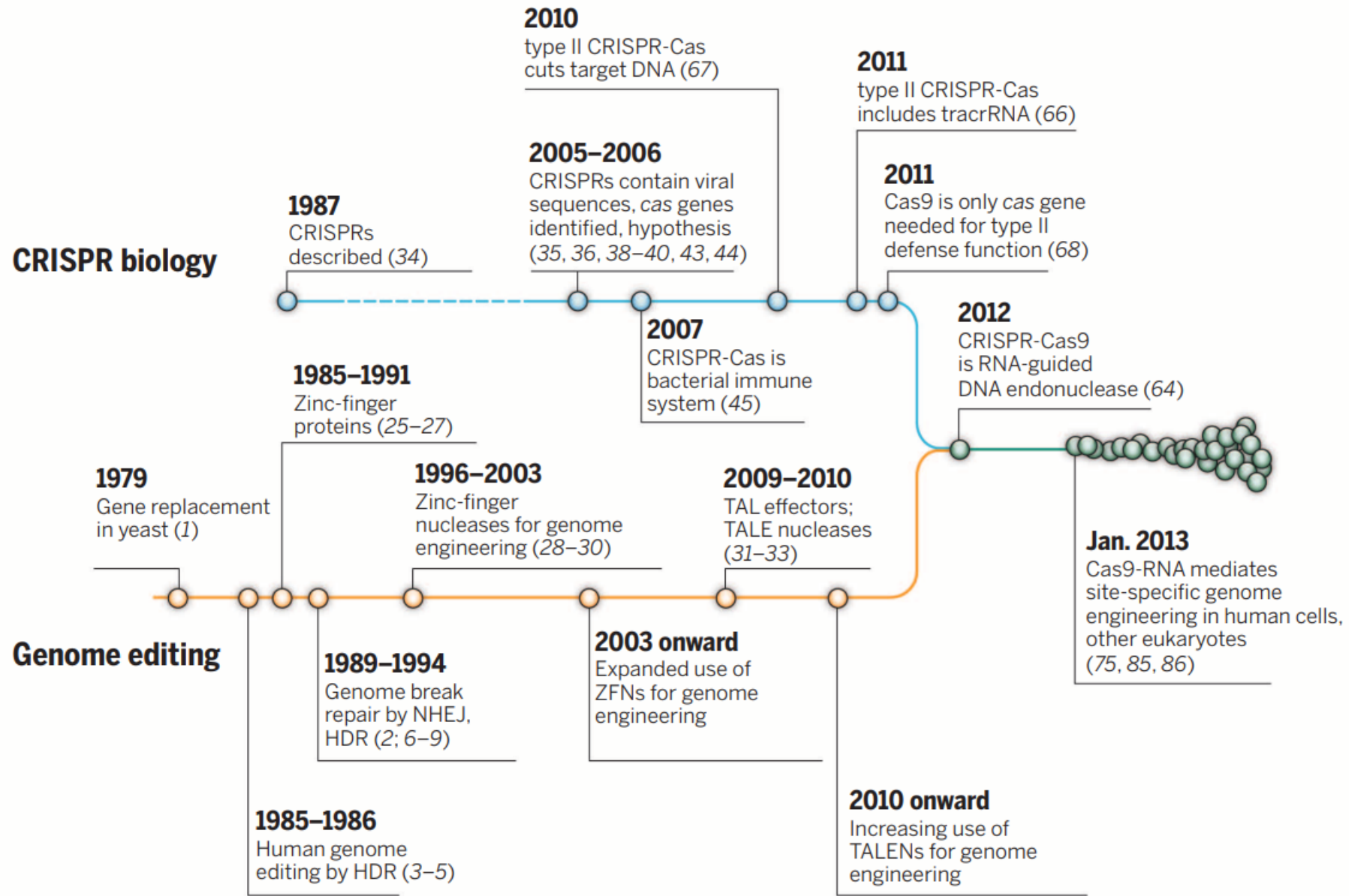
How does it work?

How is it used?

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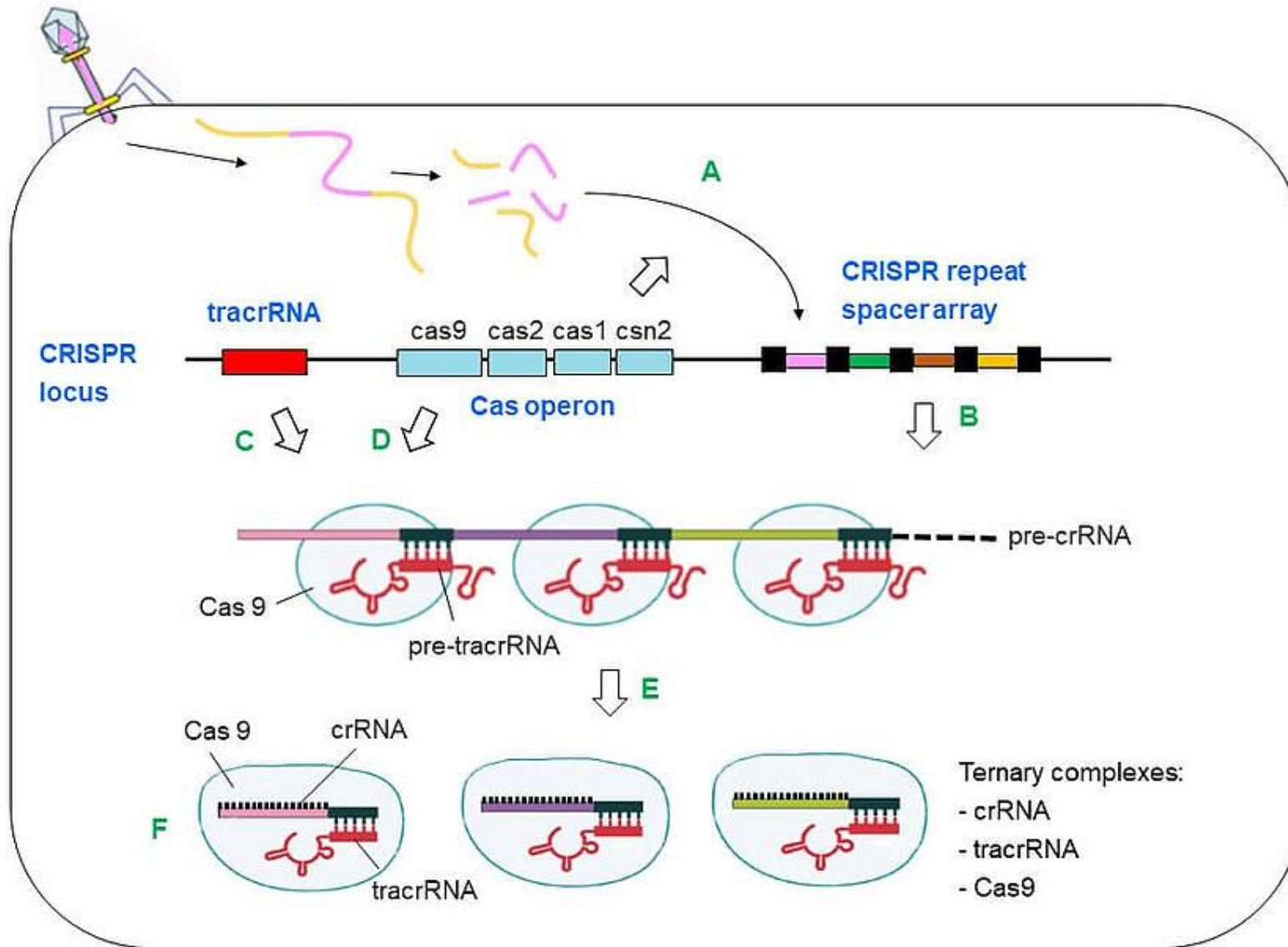


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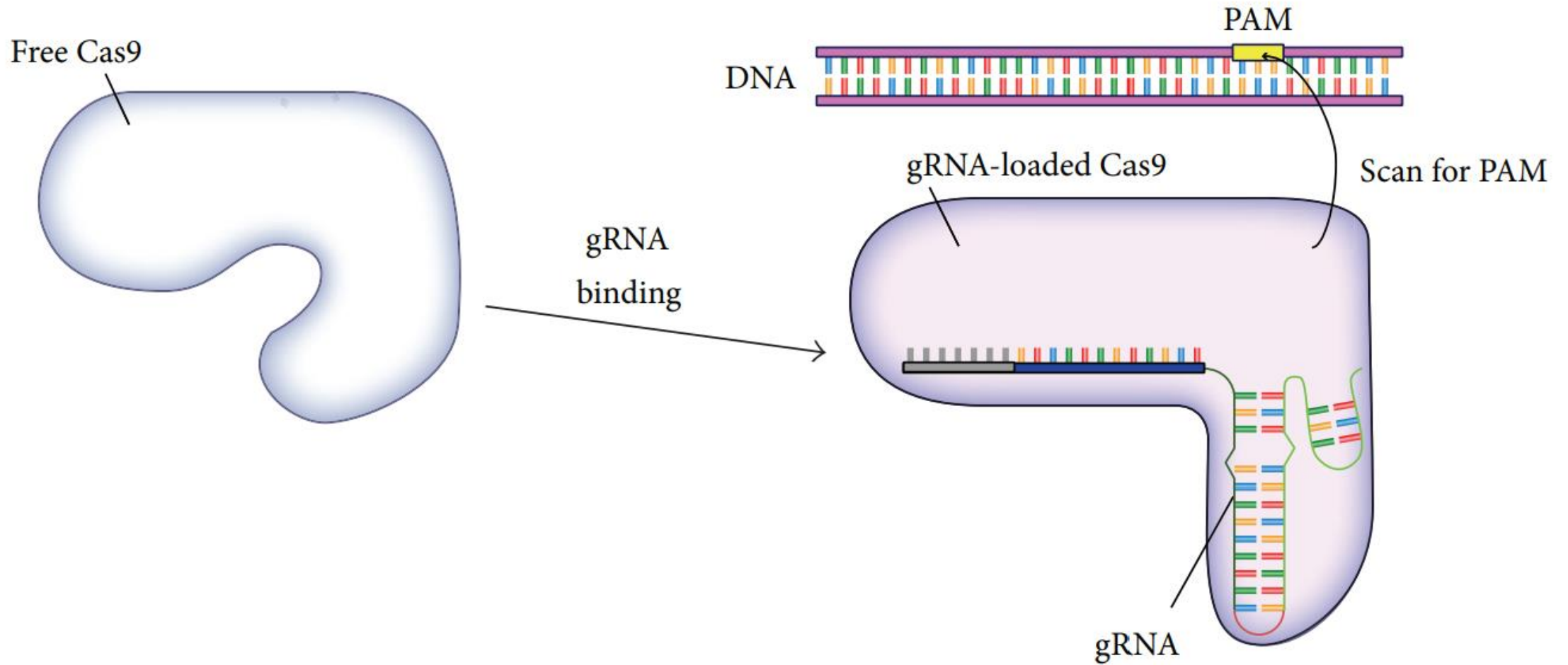


Source: Doudna, J. A., & Charpentier, E. (2014). *The new frontier of genome engineering with CRISPR-Cas9*. *Science*, 346(6213), 1258096–1258096. doi:10.1126/science.1258096

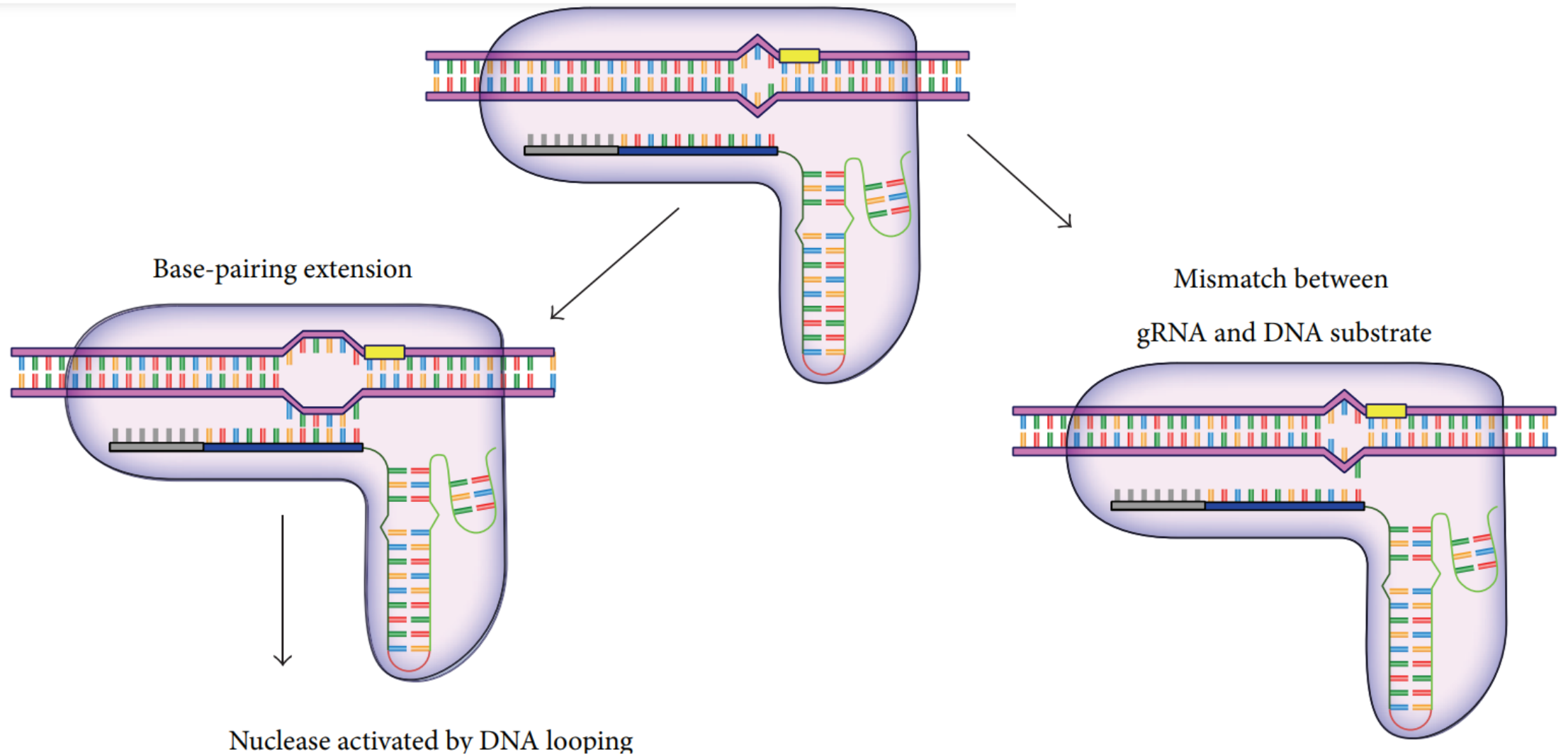




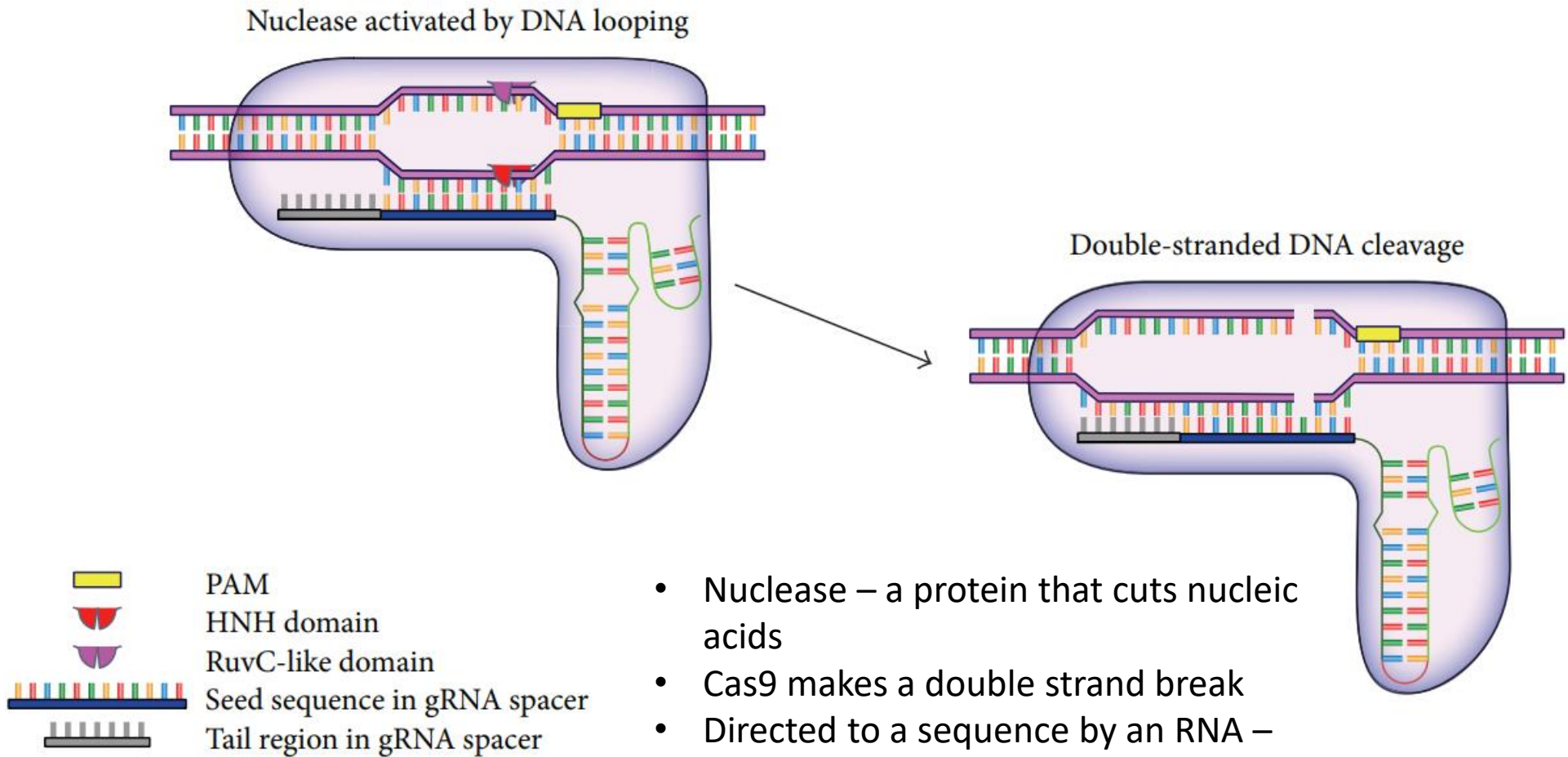
Source: Doudna, J. A., & Charpentier, E. (2014). *The new frontier of genome engineering with CRISPR-Cas9*. *Science*, 346(6213), 1258096-1258096. doi:10.1126/science.1258096



Source: Bing Shui, Liz Hernandez Matias, Yi Guo, Ying Peng, "The Rise of CRISPR/Cas for Genome Editing in Stem Cells", *Stem Cells International*, vol. 2016, Article ID 8140168, 17 pages, 2016.
<https://doi.org/10.1155/2016/8140168>



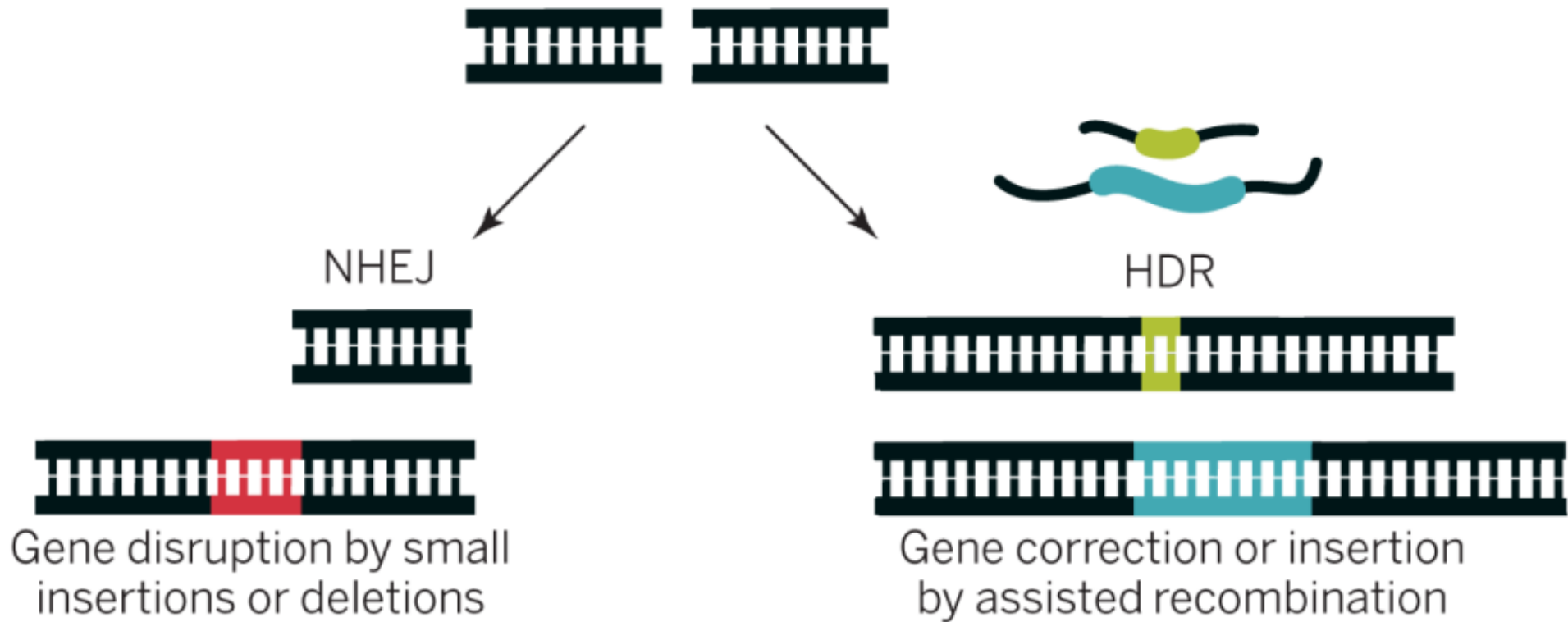
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<https://doi.org/10.1155/2016/8140168>



- Nuclease – a protein that cuts nucleic acids
- Cas9 makes a double strand break
- Directed to a sequence by an RNA – in bacteria the RNA produced from the CRISPR loci
- Nearly ANY sequence

Source: Bing Shui, Liz Hernandez Matias, Yi Guo, Ying Peng, "The Rise of CRISPR/Cas for Genome Editing in Stem Cells", *Stem Cells International*, vol. 2016, Article ID 8140168, 17 pages, 2016.
<https://doi.org/10.1155/2016/8140168>

sgRNA-Cas9 double-strand DNA break



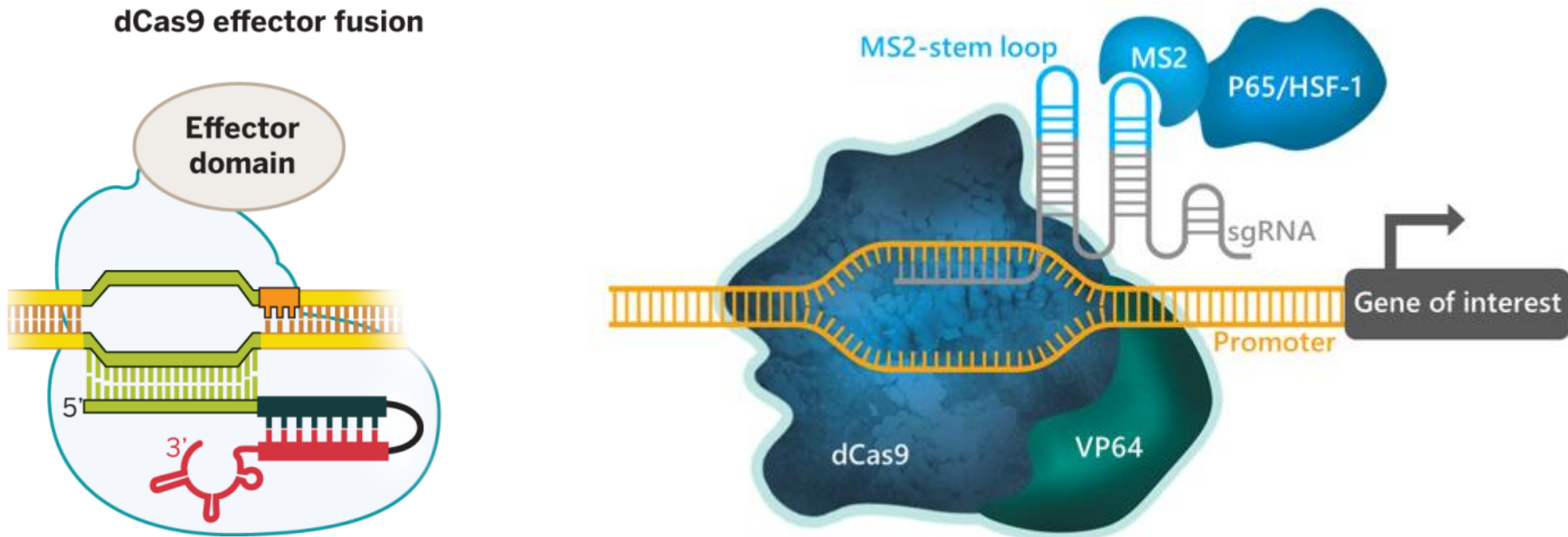
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Tissue-specific activation of gene expression by the Synergistic Activation Mediator (SAM)

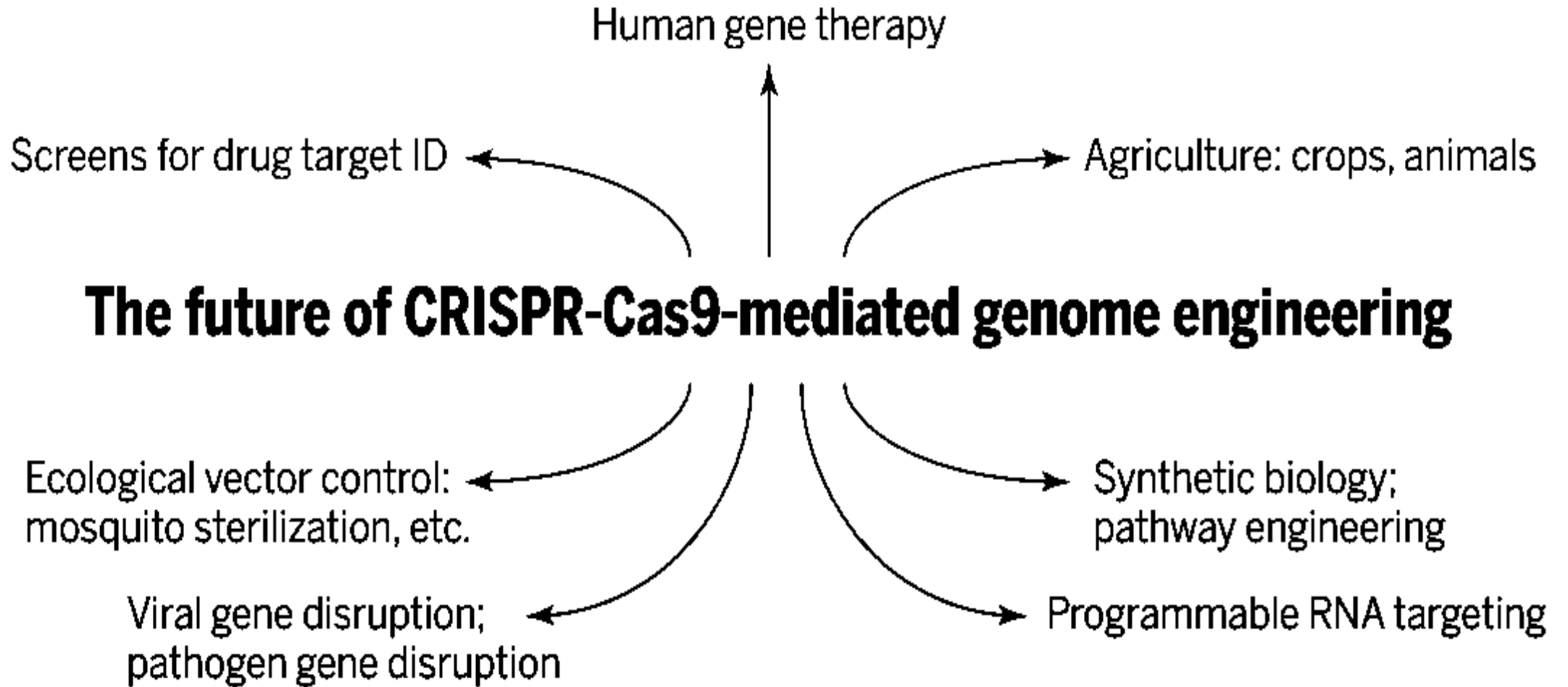


Source: Doudna, J. A., & Charpentier, E. (2014). The new frontier of genome engineering with CRISPR-Cas9. *Science*, 346(6213), 1258096–1258096. doi:10.1126/science.1258096

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Source: Doudna, J. A., & Charpentier, E. (2014). The new frontier of genome engineering with CRISPR-Cas9. *Science*, 346(6213), 1258096–1258096. doi:10.1126/science.1258096

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CELL-BASED FOOD



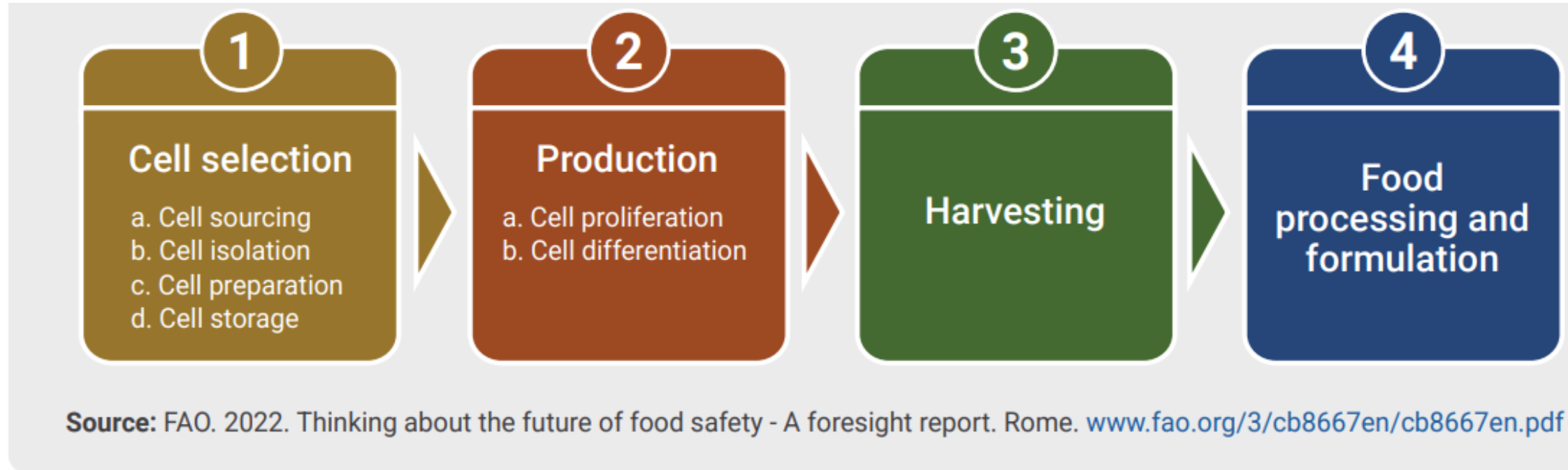
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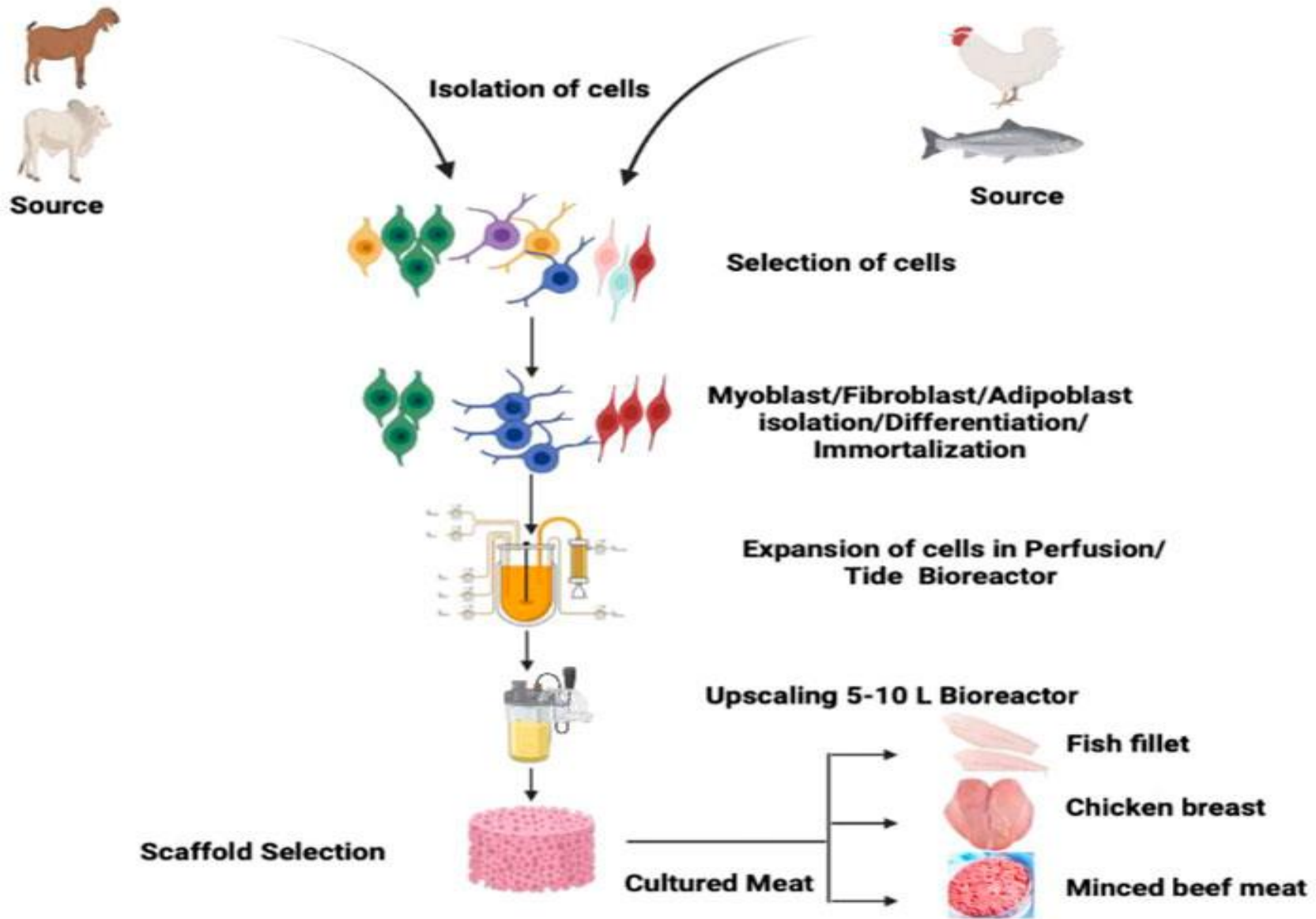


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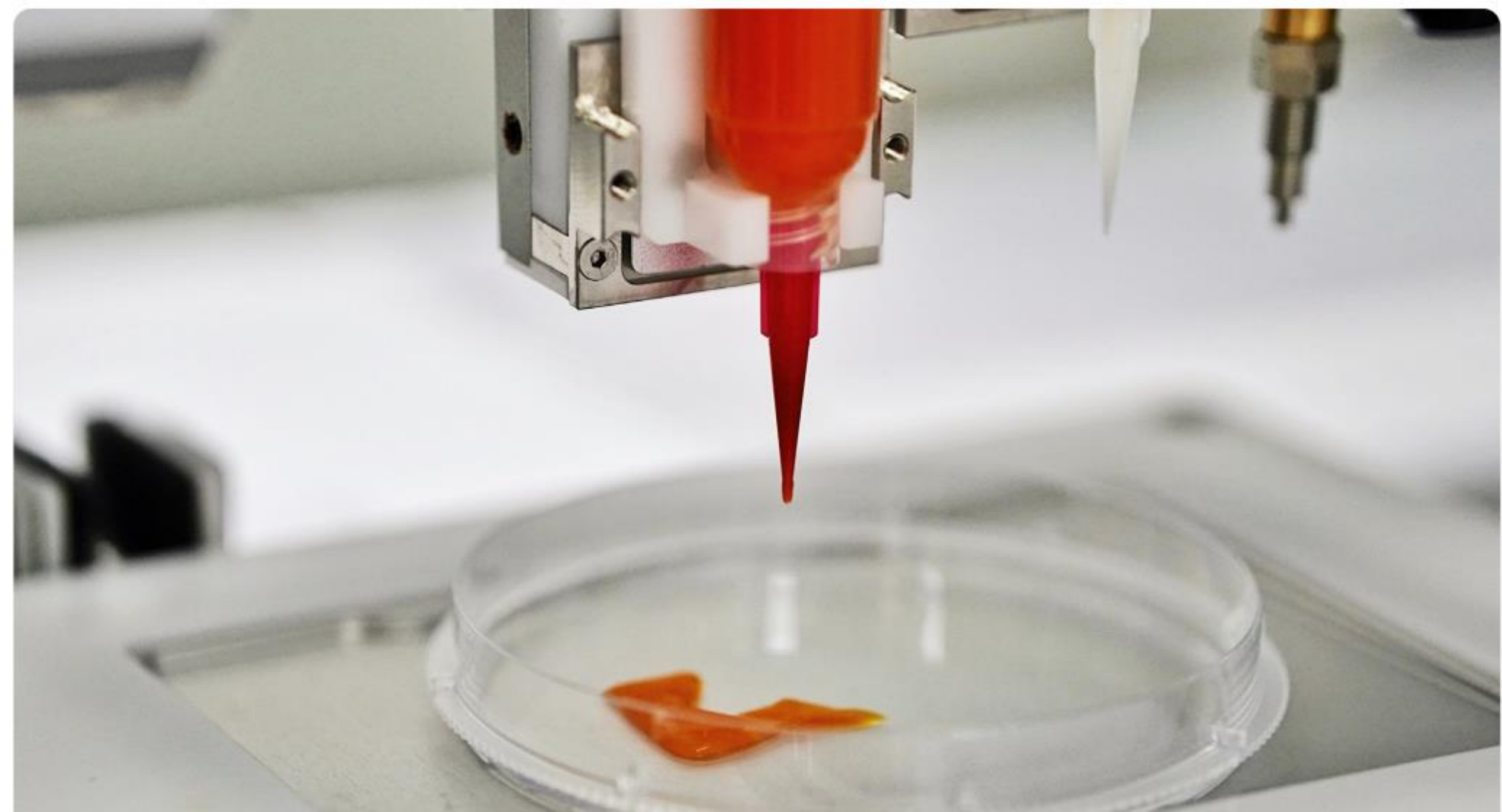
A genetic overview of the cell-based food production process

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Source: Azhar, Asim & Zeyuallah, Md & Bhunia, Shushruta & Kacham, Santhosh & Patil, Girish & Muzammil, Khursheed & Khan, Mohammad & Sharma, Sandeep. (2023). Cell-based meat: The molecular aspect. *Frontiers in Food Science and Technology*. 3. 10.3389/frfst.2023.1126455.



Source: <https://www.fortunechina.com/detail/company/impact/2022/49/shanghaishiweishengwukejiyouxiangongsi.htm>



Source: <https://www.steakholderfoods.com/blog/worlds-largest-lab-grown-steak-unveiled-by-israeli-firm>



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Thank you for your attention!

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