**Recombinant DNA Technology**

* Briefly describe (5 sentences or less) one human therapy that uses recombinant DNA technology. Explain how this therapy is an improvement over existing therapies that did not use recombinant DNA technology (if they exist!). Please cite your source(s) and do not repeat therapies that have already been listed in the thread.
* Respond to at least two of your classmates.

Since the first reported vaccine in 18th century; when Edward Jenner inoculated people with cowpox to protect them against smallpox, understanding and technologies have progressed. Older vaccination method used a dead or attenuated pathogen to activate the body’s immune system with the risk of causing the disease in an individual with a weak immune system; or not resulting in a strong or long-lasting immune response. Today a recombinant specific protein from the pathogen, the antigen, is genetically engineered and arranged in a nanoparticle with no risk of transmitting the targeted disease. COVID virus spike’s protein vaccine is one of such most recent type of recombinant vaccines.

**References**:

[1]        Nature Milestones in Vaccines: <https://www.nature.com/immersive/d42859-020-00005-8/index.html>

[2]        A. Flemming, “The origins of vaccination,” Nature Research, Sep. 2020, doi: 10.1038/d42859-020-00006-7.

[3]        I. P. Trougakos et al., “Adverse effects of COVID-19 mRNA vaccines: the spike hypothesis,” Trends in Molecular Medicine, vol. 28, no. 7, pp. 542–554, Jul. 2022, doi: 10.1016/j.molmed.2022.04.007.

Thank you for the reference to recombinant insulin, it was interesting to me to find out that since the first time insulin was expressed in E.coli, and used to control blood sugar in people with diabetes I or II; today there is no cure for diabetes and the different strategies to suppress apoptosis of beta-cells are difficult and so far been successful in some cases in animal models (<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8723777/>).