**https://www.usccb.org/resources/Answers%20to%20Key%20Ethical%20Questions%20About%20COVID-19%20Vaccines.pdf**

**1. Vaccine Development/Production and Abortion-Derived Cell Lines**

Cell lines from aborted babies might be used in any or all of the three stages of vaccine production: (1) design and development, (2) production, and (3) confirmatory lab tests.

This is a useful chart detailing many COVID vaccines, their stage of development, and their possible compromise by the use of aborted baby cell-lines: <https://s27589.pcdn.co/wp-content/uploads/2020/12/COVID-19-Vaccine-Candidates-and-Abortion-Derived-Cell-Lines.pdf>

The COVID-19 vaccine developed by AstraZeneca and similar types **use aborted cell-lines in all 3 stages of production**.

Other vaccines, such as mRNA types (Pfizer and Moderna), use the aborted cell-lines during **stage (1)**, design (to produce a modified spike protein), and also for **stage (3)**, confirmatory testing of the mRNA fragments. Confirmatory testing is made for each new batch of vaccines before they are dispatched for use. Thus the use of aborted baby cell-lines continues for these types of vaccines. **On the chart above, and many other similar charts, the use of aborted cell lines in stage (1) is not acknowledged.** But this information is readily available in the published scientific papers detailing these vaccines: e.g. for Pfizer,[[1]](#footnote-1) and for Moderna.[[2]](#footnote-2) See below.

**2. Moderna (mRNA-1273) Vaccine**

1. In March 2020, researchers investigated the (S) spike protein that enables the virus to infect a host cell. The S protein has two states: “down” conformation which makes infection inaccessible, and “up” conformation, which allows infection by binding to an ACE-2 receptor.

Because of the indispensable function of the S protein, it represents a target for antibody-mediated neutralization, and characterization of the prefusion S structure would provide atomic-level information to guide vaccine design and development. […] We obtained ~0.5 mg/liter of the recombinant prefusion-stabilized S ectodomain from **FreeStyle 293 cells[[3]](#footnote-3)** and purified the protein to homogeneity by affinity chromatography and size-exclusion chromatography.[[4]](#footnote-4)

Therefore to make the S protein, the researchers **used HEK-293 cells**, so that they could study and modify this protein: to stabilize S proteins in the prefusion state, to improve their expression, and to increase immunogenicity (provoked by the S proteins).

2. In July 2020, in a preliminary report on the testing of the mRNA-1273 vaccine, researchers acknowledged **their use of HEK-293** cell lines.[[5]](#footnote-5) In a supplementary appendix (July 27, 2020)[[6]](#footnote-6) the team described how the **HEK-293 cells were first used** to produce SARS-CoV-2 pseudoviruses, and then ACE-2-overexpressing **293T cells were used** in a neutralization assay[[7]](#footnote-7) to detect the presence of antibodies.

3. Researchers explained in Aug 2020,[[8]](#footnote-8) that for the development of the mRNA-1273 vaccine, **Expi293 cells (adapted HEK-293 cells)**[[9]](#footnote-9) were used for (1) the stabilization of the S protein by expressing them ‘by transfection of plasmids into Expi293 cells’, (2) the design and production of recombinant minifibritin foldon protein, (3) *in vitro* mRNA expression, and (4) lentivirus-based pseudovirus-neutralization assay to test for the effectiveness of the vaccine. In other words, HEK-293 cells were used **at every stage of the development** of this vaccine.

4. The U.S. patent for ***in vivo* production** of proteins lists many tests **using HEK-293 cells**, including the method of delivery of this vaccine: mRNA encased in lipids.[[10]](#footnote-10) This is to see if the vaccine is stable and works as expected in real life (not just *in vitro*).

For a useful collation of relevant documents and links, see here: <https://cogforlife.org/2020/11/16/moderna-covid-19-vaccine-facts-not-fiction/>

**3. Pfizer/BioNTech (BNT162b2) Vaccine**

1. In September 2020, researchers explained[[11]](#footnote-11) that they **used HEK-293 cells** for (1) *in vitro* transfection with the BNT162b2 RNA vaccine yielding a **robust expression of P2 S proteins**, (2) **structural characterisation**, by expressing P2 S proteins, (3) **pseudovirus-neutralization**. In other words, HEK-293 cells were **used in each stage of development of the vaccine** in the re-design of the S protein and to see if the cells produced the S protein as expected.

2. The U.S. patent describes how RNA fragments encoding proteins (including S proteins) were tested on a variety of cell lines, **including HEK-293.**[[12]](#footnote-12) This was to check that the vaccine was stable and functioning as expected.

1. <https://www.biorxiv.org/content/10.1101/2020.09.08.280818v1.full> [↑](#footnote-ref-1)
2. <https://www.nature.com/articles/s41586-020-2622-0> [↑](#footnote-ref-2)
3. A daughter cell line derived from HEK-293. <https://web.expasy.org/cellosaurus/CVCL_D603> [↑](#footnote-ref-3)
4. *Cryo-EM structure of the 2019-nCoV spike in the prefusion conformation* byDaniel Wrapp, et al., in *Science* (13 Mar 2020): Vol. 367, Issue 6483, pp. 1260-1263. <https://science.sciencemag.org/content/367/6483/1260> [↑](#footnote-ref-4)
5. *An mRNA Vaccine against SARS-CoV-2 — Preliminary Report,* by Lisa A. Jackson et al. (mRNA-1273 Study Group), in NEJM (July 14, 2020), 383, pp. 1920-1931. <https://www.nejm.org/doi/full/10.1056/NEJMoa2022483> [↑](#footnote-ref-5)
6. <https://www.nejm.org/doi/suppl/10.1056/NEJMoa2022483/suppl_file/nejmoa2022483_appendix.pdf> [↑](#footnote-ref-6)
7. <https://www.sciencedirect.com/topics/medicine-and-dentistry/virus-neutralization> [↑](#footnote-ref-7)
8. #  *SARS-CoV-2 mRNA vaccine design enabled by prototype pathogen preparedness,* by Kizzmekia S. Corbett, et al., in *Nature* (Aug 5, 2020) 586, pp. 567–571. <https://www.nature.com/articles/s41586-020-2622-0>

 [↑](#footnote-ref-8)
9. <https://assets.thermofisher.com/TFS-Assets/LSG/manuals/MAN0019402_Expi293_ExpressionSystem_3L_UG.pdf> [↑](#footnote-ref-9)
10. <http://patft.uspto.gov/netacgi/nph-Parser?Sect1=PTO1&Sect2=HITOFF&d=PALL&p=1&u=%2Fnetahtml%2FPTO%2Fsrchnum.htm&r=1&f=G&l=50&s1=10,583,203.PN.&OS=PN/10,583,203&RS=PN/10,583,203> [↑](#footnote-ref-10)
11. <https://www.biorxiv.org/content/10.1101/2020.09.08.280818v1.full.pdf> [↑](#footnote-ref-11)
12. <http://patft.uspto.gov/netacgi/nph-Parser?Sect1=PTO1&Sect2=HITOFF&d=PALL&p=1&u=%2Fnetahtml%2FPTO%2Fsrchnum.htm&r=1&f=G&l=50&s1=10,669,322.PN.&OS=PN/10,669,322&RS=PN/10,669,322> [↑](#footnote-ref-12)