Several COVID-19 vaccine candidates (AstraZeneca/University of Oxford, Janssen Pharmaceutical Companies, Vaxart) are developed with the use of stem cell lines from elective abortion. Though considered controversial, the cells used in production are purified clones of decades-old aborted embryo's cells and merely function as host cells to generate viral vectors.

Ethical concerns have aroused regarding the use of abortion-derived cell lines in some of the COVID-19 vaccine development. Two major fetal cell lines are currently used in the development of COVID-19 vaccines. Human embryonic kidney cells (HEK-293) were originally derived from aborted fetal kidney tissue back in the 1970s and were developed into the immortalized cell lines in vitro. Human embryonic retinal cells (PER.C6) were originally derived from aborted fetal retinal tissue back in the 1980s and were later developed into cell lines as well.

## Analysis of SARS-CoV-2 (COVID-19) Vaccine Candidates, Updated NOV 24, 2020

Sponsor (s)	Country	Clinical Trial Stage	Production
AstraZeneca/University of Oxford	USA/UK	Phase 3	HEK293 cells
Janssen Research & Development, Inc./Johnson & Johnson	USA	Phase 3	PER.C6 cells
Vaxart	USA	Phase 1	HEK293 cells
University of Pittsburgh	USA	Pre-clinical	HEK293 cells

In response to the ethical objections, AstraZeneca spokesperson and other experts reassure that the vaccine itself is not developed in HEK-293 cells. The cells used in production are purified clones of HEK-293 which technically do not contain any fragmented DNA from the original cell lines.

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