

COVID-19 Vaccines

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Fetal cell strains

So far no authorized vaccine or those in Phase 3 trials have avoided using fetal tissue cell strains in some way.

Vaccines listed in blue/italics do not use fetal tissue cell strains for manufacture and do not contain fetal cell strains, but did use the HEK-293 fetal cell strain for confirmatory testing. Vaccines listed in bold/red use fetal tissue cell strains in their manufacture and as an ingredient. The Moderna vaccine does not include a fetal cell strain as an ingredient, but relied on fetal cell strains for its development.

- *BioNTech/Pfizer* (FDA emergency authorization)
- *Moderna/NIH* (FDA emergency authorization)
- **AstraZeneca/University of Oxford** (Phase 3/emergency authorization in UK)
- **Janssen/Johnson & Johnson** (Phase 3)
- *Novovax* (Phase 3)

More details on the use of fetal cell strains and particular COVID-19 vaccines may be found [here](#).

While the use of a fetal cell strain in testing is not acceptable, the Pfizer and Novovax vaccines do not use fetal cell strains in an ongoing way, nor do they contain them as ingredients. For those who are at high risk for COVID-19 and desire to be vaccinated, these are the least objectionable.

Because the AstraZeneca and Janssen vaccines continue to use fetal cell strains in their manufacture, these should be avoided and considered unacceptable.

The Moderna vaccine does not use fetal cell strains as an ingredient, but was dependent upon fetal cell strains not only for confirmatory testing, but also in a few stages of development (in isolating the spike protein sequence, in developing the mRNA expression, and in determining the lipid delivery system), as summarized [here](#). This heavy dependence makes it an undesirable option, especially with other, less objectionable vaccines available.

Vaccine Effectiveness

The [most recent data](#) indicates that the Pfizer vaccine is effective against mutations.

Moderna's CEO expects its vaccine to [provide immunity](#) for a "couple of years," while recognizing the immunity varies across individuals. No hard evidence on the length of immunity is available yet.

Concerns about side effects

Trials and other research have positively indicated the usual concerns of typical reactions associated with any vaccine (swelling at the injection spot, mild fever, etc.). More severe, anaphylactic reactions, are expected in very small rates. In addition, there is some [concern](#) that

polyethylene glycol, an ingredient used in both the Pfizer and Moderna vaccines, may cause anaphylactic reaction at a higher rate, even causing an allergy where one did not previously exist. [Anaphylactic reaction](#) has occurred at a rate roughly [ten times higher](#) than in the flu vaccine.

A very small number of people have died after receiving the vaccine, most of which cases are not unusual, considering the age of the recipients. Two deaths of younger, seemingly healthy recipients, a [health care worker](#) and a [physician](#), are worth paying attention to in the coming weeks. There is no evidence that their deaths are directly related to receiving the vaccine.

The possibility of the other side effects have been hypothesized, but there is yet insufficient research to state if these are definitively associated with COVID-19 vaccines:

1. The use of mRNA technology (specifically in the Pfizer and Moderna vaccines) is a [new way of vaccinating](#). While it can be called a type of gene therapy, it should be [clearly distinguished from DNA modification](#). The mRNA does not enter cell nuclei and does not affect DNA. However, [two other concerns related to mRNA technology](#) involve autoimmune responses and edema tied to “extracellular RNA.”
2. Some have speculated that some recipients could suffer more severe cases of the disease in some recipients ([Antibody-dependent enhancement](#) [ADE]). ADE occurs when vaccine-induced antibodies and other means to fight a disease operate unexpectedly to facilitate the spread of the disease in the body rather than to fight it. While [initial research in this area](#) has not suggested that the COVID-19 vaccines increase the chance of ADE, data is still limited.
3. There is budding research suggesting that SARS-CoV-2 itself may harm male fertility:
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7252417/>
<https://wjmh.org/DOIX.php?id=10.5534/wjmh.200170>
<https://jamanetwork.com/journals/jamanetworkopen/fullarticle/2765654>

It’s unknown from the research if some of the effects on infertility may be caused by antibodies as well as the virus; if antibodies, then the vaccine also could endanger male fertility.

4. Some have speculated that the vaccine could produce undesired [antibodies against Syncytin-1](#), a cell fusion protein fundamental to placental development, due to an overlap in the amino acid sequence between Syncytin-1 and SARS-CoV-2. If some did develop these antibodies, they could cause infertility in women. [Current hypotheses](#) suggest that such infertility is extremely unlikely because the overlap in the amino acid sequence is too small to cause antibodies against Syncytin-1. Nevertheless, because no research has yet been done on the effect on infertility in women, there is no data yet to reach a conclusion. [Instructions issued in the UK](#) for Pfizer’s vaccine state that the effect on fertility is unknown.

5. [Bell's palsy](#). There is no definitive link to the usually temporary Bell's palsy, but [FDA officials do note](#) to watch for it in conjunction with vaccinations.

Long-term safety and data documentation

Over the long run, the public should continue to be aware of issues of safety documentation and transparency. Things to consider include plans by pharmaceutical companies and the government for documenting

- rates and types of adverse events;
- safety in different groups, such as the elderly, children, and pregnant;
- categorization of susceptible subgroups;
- long-term tracking of vaccine safety.

Conclusions

I would warn women still capable of bearing children and without risk factors for COVID-19 against taking the vaccine. Women with risk factors for COVID, but still capable of bearing children, should consider their options conscientiously. Some men who are concerned about their fertility have ground for concern about the disease itself. However, if this is shown to be a real result of the disease, the vaccine itself could also have the same effect.

Some populations at high risk for complications or death from COVID-19 may choose to receive the Pfizer vaccine, or, when available, the Novovax vaccine. Due to their use of fetal tissue cell strains as an ingredient, the AstraZeneca and Janssen/Johnson & Johnson vaccines should be avoided. The Moderna vaccine, likewise, due to its heavy dependence on fetal tissue cell strains for development, should be avoided, especially with other options available.

Those with allergies to ingredients should not take the vaccine, and those with a history of anaphylactic reactions should consider the benefits and risks of the vaccine in more detail.

Still others may choose not to take a vaccine for now due to the relatively small amount of data on their side effects.

Whatever the choice, it should be supported when made conscientiously, considering the ethical sourcing of the vaccine and one's specific responsibilities and circumstances.

Gifford A. Grobien