Vaccines can prevent serious illness, or prevent serious complications from infection, and are an important part of family and public health across the globe.

Currently, three COVID-19 vaccines, Pfizer-BioNTech, Moderna, and Janssen/Johnson & Johnson are approved for Emergency Use in the United States. Additionally, Novavax and Oxford-AstraZeneca are currently testing their vaccines in Phase 3 clinical trials. There are many other COVID-19 vaccines being tested or are already approved for use in other countries. For current, up-to-date information on the status of COVID-19 vaccines across the world, you can visit The New York Times Coronavirus Vaccine Tracker here.

The 3 Types of COVID-19 Vaccines in the United States are:
1. **Viral Vector**: Johnson & Johnson and Oxford-AstraZeneca
2. **Nucleic Acid (mRNA)**: Pfizer-BioNTech and Moderna
3. **Protein-based**: Novavax

<table>
<thead>
<tr>
<th>Types of Vaccines</th>
<th>Viral Vector</th>
<th>Nucleic Acid (mRNA)</th>
<th>Protein-based</th>
</tr>
</thead>
<tbody>
<tr>
<td>How it Works</td>
<td>This approach takes a modified virus and uses it to deliver viral genes to build immunity</td>
<td>This vaccine uses RNA molecules to teach the immune system to target key viral proteins</td>
<td>This vaccine uses a piece of a virus’ surface to focus your immune system on a single target</td>
</tr>
<tr>
<td>Existing Examples</td>
<td>• Ebola • Veterinary Medicine</td>
<td>• COVID-19</td>
<td>• Pertussis • Human Papillomavirus (HPV)</td>
</tr>
<tr>
<td>Sponsor of the COVID-19 vaccine being tested in USA</td>
<td>• Johnson &amp; Johnson • Oxford-AstraZeneca</td>
<td>• Pfizer-BioNTech • Moderna</td>
<td>• Novavax</td>
</tr>
</tbody>
</table>
Viral Vector

Viral vector vaccines insert genetic material from the COVID-19 virus into a weakened known virus (such as adenovirus). The weakened virus is used as a vector (or carrier) and is not able to cause disease. Once the vaccine is injected, the COVID-19 genetic material within the vector gives cells instructions to make B-Cells and T-Cells that will remember how to fight the virus if ever infected. The Johnson & Johnson COVID-19 vaccine is a viral vector vaccine.

Nucleic Acid (mRNA)

Nucleic Acid vaccines contain mRNA directions that give your body’s cells instructions on how to make a unique Coronavirus protein. When the mRNA vaccine is injected, your body makes copies of the COVID-19 spike protein, prompting an immune response. Once your body makes copies of the protein, the mRNA material is destroyed, and if infected with the COVID-19 virus, your body will be able to fight the virus far better and faster than without the vaccination. Interesting to know, mRNA vaccine technology is not new; scientists have studied mRNA vaccines for decades. Also, mRNA vaccines do not use live virus, so the COVID-19 virus would not enter your body by injecting the vaccine. The Pfizer-BioNTech and Moderna vaccines are mRNA vaccines.

Protein-based

Protein-based vaccines include viral protein subunits. To work, these vaccines use the COVID-19 spike protein or a receptor protein of the COVID-19 virus and an ingredient (an adjuvant) to create a stronger immune response. When you receive this type of vaccine, your immune system recognizes that the protein does not belong in your body and will begin making T-Cells and antibodies to fight it, allowing your immune system to recognize any future infection. The Novavax vaccine is a protein-based vaccine.

*This information was last reviewed on March 2nd, 2021 by the NephCure COVID-19 Medical Advisory Committee. NephCure will provide updated information as it becomes available.

References:
1. https://www.nature.com/articles/d41586-020-01221-y
5. https://www.nature.com/articles/nrd.2017.243