Vaccine 101: A Needle Today Helps Keep COVID Away

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COVID-19 vaccines are safe and effective and will protect you, your loved ones, and those most vulnerable
1. Why was COVID vaccine created so quickly?

- **Science**: Decades of research to work with
- **Remove Red Tape**: Prioritizing treatment and vaccine
- **Volunteers**: Public interest in enrolling in clinical trial, and surges of COVID-19 cases
- **Work Together**: Sharing of information and working together across the world
- **Funding**: Remove financial risk for companies
- **Manufacturer**: Mass production occurred at the same time as clinical trials
Why was COVID vaccine created so quickly?

- Development of the vaccine was faster than usual for explainable reasons
- In developing the COVID-19 vaccine
  - Safety was prioritized
  - Steps were not skipped
  - Shortened timeline ≠ Not safe
2. What is in the vaccine?

### Comirnaty

<table>
<thead>
<tr>
<th>Description</th>
<th>Pfizer-BioNTech (mRNA)</th>
<th>Moderna (mRNA)</th>
<th>Janssen (viral vector)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Active ingredient</strong></td>
<td>Nucleoside-modified mRNA encoding the viral spike (S) glycoprotein of SARS-CoV-2</td>
<td>Nucleoside-modified mRNA encoding the viral spike (S) glycoprotein of SARS-CoV-2</td>
<td>Recombinant, replication-incompetent Ad26 vector, encoding a stabilized variant of the SARS-CoV-2 Spike (S) protein</td>
</tr>
<tr>
<td>2-[(polyethylene glycol)-2000]-N, N-ditetradecylacetamide</td>
<td>PEG2000-DMG: 1, 2-dimyristoyl-rac-glycerol, methoxypolyethylene glycol</td>
<td>Polysorbate-80</td>
<td></td>
</tr>
<tr>
<td>1,2-distearoyl-sn-glycero-3-phosphocholine</td>
<td>1,2-distearoyl-sn-glycero-3-phosphocholine</td>
<td>2-hydroxypropyl-β-cyclodextrin</td>
<td></td>
</tr>
<tr>
<td>Cholesterol</td>
<td>Cholesterol</td>
<td>Citric acid monohydrate</td>
<td></td>
</tr>
<tr>
<td>(4-hydroxybutyl)azanediyl)bis(hexane-6,1-diyl)bis(2-hexyldecanoate)</td>
<td>SM-102: heptadecane-9-yl 8-((2-hydroxyethyl) (6-oxo-6-(undecyloxy) hexyl) amino) octanoate</td>
<td>Trisodium citrate dihydrate</td>
<td></td>
</tr>
<tr>
<td>Sodium chloride</td>
<td>Tromethamine</td>
<td>Sodium chloride</td>
<td></td>
</tr>
<tr>
<td>Monobasic potassium phosphate</td>
<td>Tromethamine hydrochloride</td>
<td>Ethanol</td>
<td></td>
</tr>
<tr>
<td>Potassium chloride</td>
<td>Acetic acid</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dibasic sodium phosphate dihydrate</td>
<td>Sodium acetate</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sucrose</td>
<td>Sucrose</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
What is NOT in the vaccine?

• No preservatives, eggs, latex
• No metals
• No microchips
3. How do the vaccines work?
How do the vaccines work?

- Do not change or interact with your DNA in any way
- It does not contain a live virus (including COVID-19)
- It cannot make you sick with COVID-19
4. Do the vaccines really work?

<table>
<thead>
<tr>
<th>Reduction in risk of hospitalization for elderly</th>
<th>Cominarty</th>
<th>Moderna</th>
<th>Janssen</th>
</tr>
</thead>
<tbody>
<tr>
<td>For 65-74yo</td>
<td>96%</td>
<td>96%</td>
<td>84%</td>
</tr>
<tr>
<td>For ≥ 75yo</td>
<td>99%</td>
<td>98%</td>
<td>85%</td>
</tr>
</tbody>
</table>

If a vaccine has an efficacy of 80 percent:

- It does not mean that the vaccine will only work 80% of the time.
- It does mean that in a vaccinated population, 80% fewer people will contract the disease when they come in contact with the virus.
Do the vaccines really work?

• Vaccines are effective in reducing your risk of getting COVID-19, reduces the severity, and your risk of severe complications from COVID-19
• Effective ≠ 100% prevention against COVID-19
Do the vaccines really work?

• It is effective and protects against current variants including Delta variant
  • 65-96% for Comirnaty (Pfizer/BioNTech)
  • 72-93% for Moderna
  • More studies are needed for Janssen

If it’s effective, why do we need additional doses?

- We may need COVID-19 vaccine boosters in the future
  - Potentially in the Fall
  - Pending approval from FDA and CDC

- Overtime, the body loses its protective antibodies → Boosters

- Immunocompromised individuals → Require a third dose
5. Are the vaccines really safe?

Yes!

• Comirnaty (Pfizer) vaccine is FDA approved 16 years old and older
• Common side effects include sore muscles (arm), feeling tired, mild fever
• More than 174.6 million individuals are fully vaccinated in the US
• Serious health effects are rare
Are the vaccines really safe?

<table>
<thead>
<tr>
<th>Condition</th>
<th>Description</th>
</tr>
</thead>
</table>
| **Inflammation of Heart** | For mRNA vaccine  
Vaccine: 0.0014%  
COVID-19: 2.3% |
| **Anaphylaxis** | 2-5 cases/million  
No deaths |
| **GBS**         | For J&J Vaccine  
7.8 cases/million doses |
| **Death**       | 0.0018% rate of death from COVID-19 vaccine |
| **Clots**       | For J&J Vaccine  
3 cases/million  
7 cases/million for women  
18-49yo |
Are the vaccines really safe?

The benefits outweigh the risk!

<table>
<thead>
<tr>
<th>Chance in a million of...</th>
<th>25-year-old</th>
<th>55-year-old</th>
</tr>
</thead>
<tbody>
<tr>
<td>dying with coronavirus</td>
<td>23 in a million</td>
<td>800 in a million</td>
</tr>
<tr>
<td>dying due to an accident or injury</td>
<td>110 in a million</td>
<td>180 in a million</td>
</tr>
<tr>
<td>dying in a road accident</td>
<td>38 in a million</td>
<td>23 in a million</td>
</tr>
<tr>
<td>being hit by lightning this year</td>
<td>1 in a million</td>
<td>1 in a million</td>
</tr>
</tbody>
</table>

Figures show the chance of dying with coronavirus since the start of the pandemic. Figures for accidents and car crash fatalities are for 2018.

Source: Winton Centre for Risk and Evidence Communication
Is it safe if I want to get pregnant one day?

- There is no evidence that any vaccine, including COVID-19, that causes fertility problems
- Multiple organizations recommends the vaccine for pregnant women
  - Centers for Disease Control and Prevention (CDC)
  - American College of Obstetrics and Gynecology (ACOG)
  - Society for Fetal Medicine (SMFM)

[Sources]
https://www.cdc.gov/media/releases/2021/s0811-vaccine-safe-pregnant.html
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