

## ACTIVE INGREDIENT

## INACTIVE INGREDIENTS

### PFIZER-BIONTECH



#### MESSENGER RIBONUCLEIC ACID (mRNA)

A snippet of mRNA delivers instructions for cells to make the spike protein found in SARS-CoV-2, the virus that causes COVID-19. The immune response to this protein teaches the body to attack the actual virus in case of exposure.

### MODERNA



#### MESSENGER RIBONUCLEIC ACID (mRNA)

The Moderna vaccine, like Pfizer-BioNTech's, uses custom-designed mRNA to prime the immune system against COVID-19.

### JOHNSON & JOHNSON



#### RECOMBINANT, REPLICATION-INCOMPETENT ADENOVIRUS TYPE 26 EXPRESSING THE SARS-COV-2 SPIKE PROTEIN

A disabled version of a common cold virus is used as a vector, or vehicle, for a piece of genetic code. This fragment of DNA triggers cells to temporarily produce coronavirus spike protein, which trains the immune system to recognize and attack SARS-CoV-2.



#### SALTS

These chemicals help balance the acidity and alkalinity in the vaccine, preventing it from irritating the body's tissues.

- Potassium chloride: Used in medications to treat low potassium levels.
- Monobasic potassium phosphate: A common food additive and buffering agent.

– Sodium chloride: Ordinary table salt.

– Dibasic sodium phosphate dihydrate: Often used in packaged foods such as condensed milk and pudding.

#### SUGAR

Helps the other molecules maintain their shape during freezing.

- Sucrose: Also known as table sugar.



#### LIPIDS

These oily organic compounds are insoluble in water. They protect the structure of the mRNA and help it slip inside the patient's cells.

- ((4-hydroxybutyl)azanediyl)bis(hexane-6,1-diyl)bis
- 1,2-Distearoyl-sn-glycero-3-phosphocholine
- cholesterol



#### STABILIZERS

These ingredients work together to maintain the quality of the vaccine, and to prevent it from causing irritation.

- Acetic acid: The same chemical that gives vinegar its tang.
- Acid stabilizers: Used to control acidity in many common drugs.

– Tromethamine

– Tromethamine hydrochloride

– Sodium acetate: A salt used in IV fluid—and as a flavoring in salt-and-vinegar potato chips.

– Sucrose: Also known as table sugar.



#### LIPIDS

Protect the structure of the mRNA and help it slip inside the body's cells.

- SM-102
- 1,2-dimyristoyl-rac-glycero-3-methoxypolyethylene glycol-2000 [PEG2000-DMG]
- cholesterol
- 1,2-distearoyl-sn-glycero-3-phosphocholine [DSPC]



#### STABILIZERS

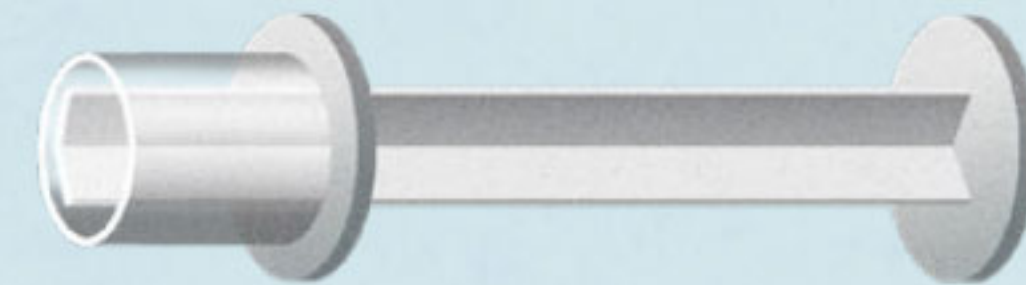
Prevent the vaccine's ingredients from separating in the vial.

- Ethanol: The same kind of alcohol found in wine, beer and distilled liquor.
- Polysorbate 80: An emulsifier used in many processed foods and cosmetics.
- 2-hydroxypropyl-β-cyclodextrin (HBCD): A sugar commonly used in pharmaceuticals.

#### SALTS

Help stabilize the ingredients and maintain pH balance.

- Trisodium citrate dihydrate: A salt derived from citric acid.
- Sodium chloride: Table salt.



#### pH BALANCERS

Prevent excessive acidity or alkalinity.

- Citric acid monohydrate: The organic acid that makes lemons taste tart.
- Trisodium citrate dihydrate: Also known as sodium citrate, this mildly alkaline chemical is often used as a flavoring in foods like Jell-O or lemonade mix.