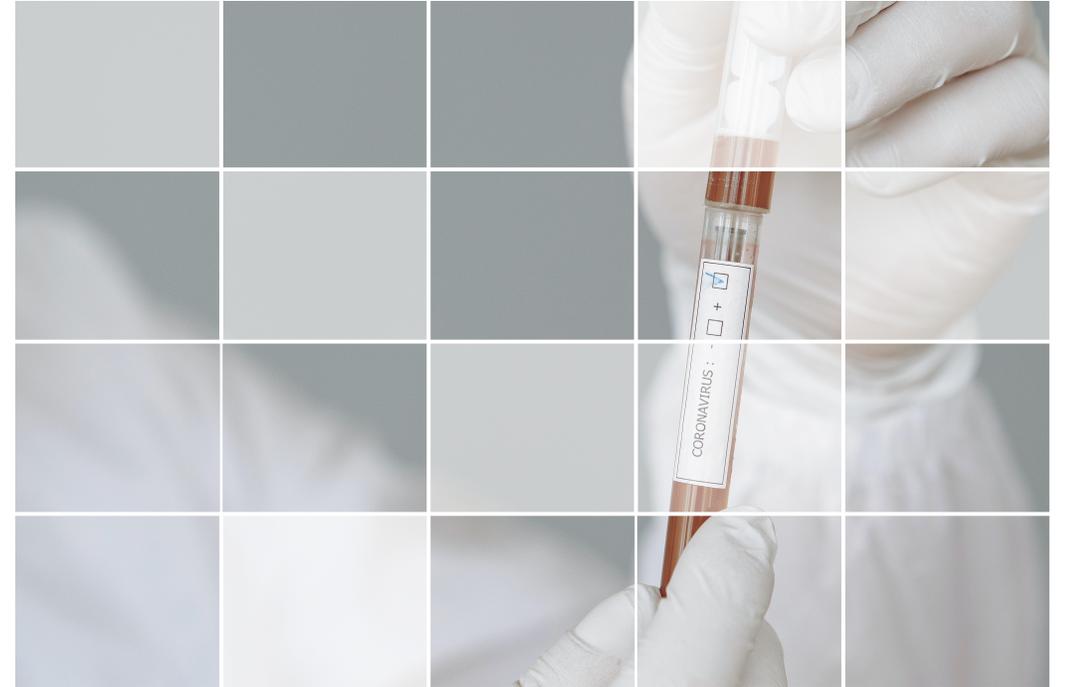




COVID-19 Vaccines Overview



2021.09

Dragon Gate Investment Partners LLC

Stella Dai

Types of Vaccines



mRNA Vaccine

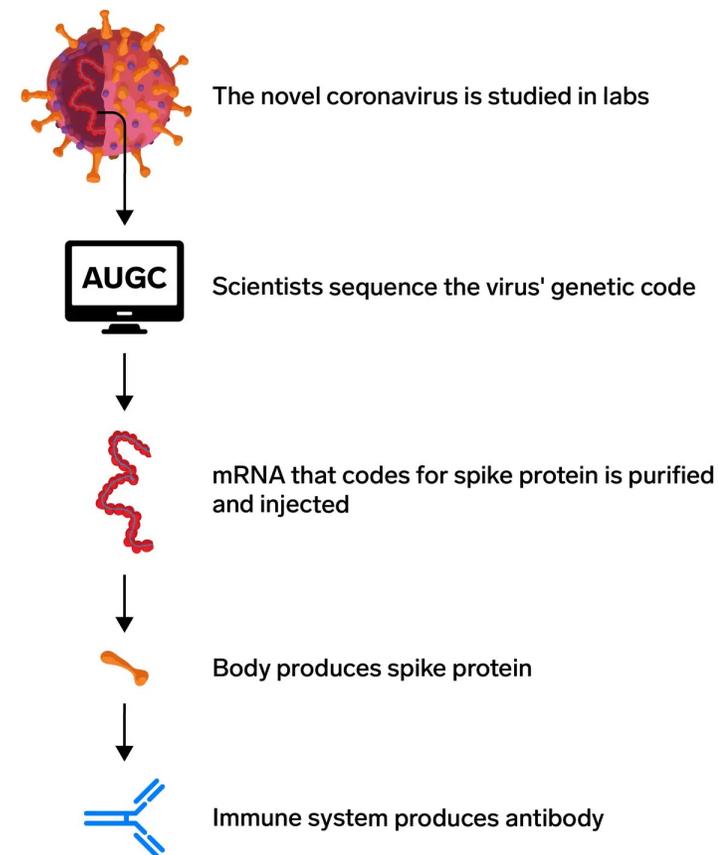
COVID-19 mRNA vaccines give instructions for our cells to make a **harmless piece** of what is called the “spike protein.” The spike protein is found on the surface of the virus that causes COVID-19.

COVID-19 mRNA vaccines are given in the upper arm muscle. Once the instructions (mRNA) are inside the immune cells, the cells use them to make the protein piece. After the protein piece is made, the cell breaks down the instructions and gets rid of them.

Next, the cell displays the protein piece on its surface. Our immune systems recognize that the protein doesn’t belong there and begin building an immune response and making antibodies, like what happens in natural infection against COVID-19.

At the end of the process, our bodies have learned how to protect against future infection. The benefit of mRNA vaccines, like all vaccines, is those vaccinated gain this protection without ever having to risk the serious consequences of getting sick with COVID-19.

How mRNA vaccines work



Source: National Institutes of Health presentation at Senate hearing on September 9, 2020.

INSIDER

Sources: Centers for Disease Control and Prevention. “Understanding mRNA COVID-19 Vaccines”, <https://www.cdc.gov/coronavirus/2019-ncov/vaccines/different-vaccines/mRNA.html>. Accessed Sept. 2, 2021; Insider. “Moderna's groundbreaking coronavirus vaccine was designed in just 2 days”, <https://www.businessinsider.com/moderna-designed-coronavirus-vaccine-in-2-days-2020-11>. Accessed Sept. 2, 2021

Viral Vector COVID-19 Vaccines

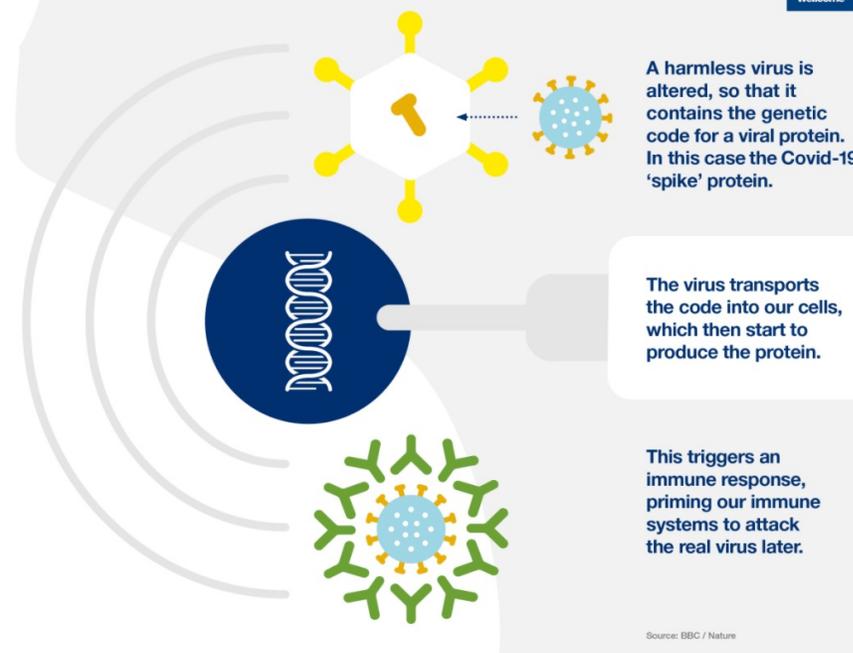
Viral vector vaccines use a modified version of a different virus (the vector) to deliver important instructions to our cells.

First, the vector (not the virus that causes COVID-19, but a different, harmless virus) will enter a cell in our body and then use the cell's machinery to produce a harmless piece of the virus that causes COVID-19. This piece is known as a spike protein and it is only found on the surface of the virus that causes COVID-19.

Next, the cell displays the spike protein on its surface, and our immune system recognizes it doesn't belong there. This triggers our immune system to begin producing antibodies and activating other immune cells to fight off what it thinks is an infection.

At the end of the process, our bodies have learned how to protect us against future infection with the virus that causes COVID-19. The benefit is that we get this protection from a vaccine, without ever having to risk the serious consequences of getting sick with COVID-19. Any temporary discomfort experienced after getting the vaccine is a natural part of the process and an indication that the vaccine is working.

How do viral vector vaccines work?





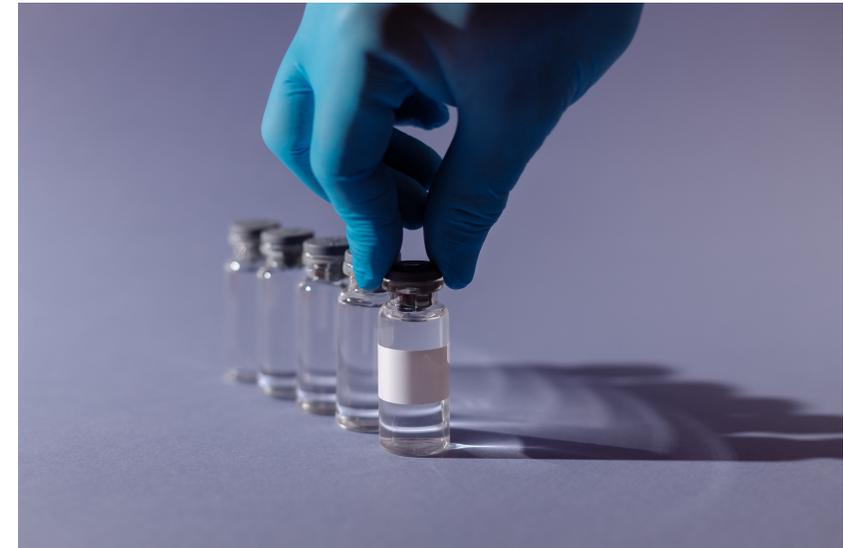
Inactivated Vaccines

Inactivated vaccines contain whole bacteria or viruses which have been killed or have been altered, so that they cannot replicate. Because inactivated vaccines do not contain any live bacteria or viruses, they cannot cause the diseases against which they protect, even in people with severely weakened immune systems. However, inactivated vaccines do not always create such a strong or long-lasting immune response as live attenuated vaccines.



Protein Subunit Vaccines

Protein subunit vaccines include **harmless pieces** (proteins) of the virus that causes COVID-19 instead of the entire germ. Once vaccinated, our bodies recognize that the protein should not be there and build **T-lymphocytes and antibodies** that will remember how to fight the virus that causes COVID-19 if we are infected in the future.





Vaccine Manufacturers



Pfizer Inc. (NYSE: PFE)



Pfizer Inc. is a research-based, global biopharmaceutical company. We apply science and our global resources to bring therapies to people that extend and significantly improve their lives through the discovery, development, manufacture, marketing, sales and distribution of biopharmaceutical products worldwide. We work across developed and emerging markets to advance wellness, prevention, treatments and cures that challenge the most feared diseases of our time. We collaborate with healthcare providers, governments and local communities to support and expand access to reliable, affordable healthcare around the world. The Company was incorporated under the laws of the State of Delaware on June 2, 1942.

Pfizer Inc. (NYSE: PFE)



46.95 +0.11 (+0.23%)

As of 3:15PM EDT. Market open.

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Previous Close	46.84	Market Cap	263.178B
Open	46.90	Beta (5Y Monthly)	0.67
Bid	46.91 x 1800	PE Ratio (TTM)	20.04
Ask	46.92 x 2900	EPS (TTM)	2.34
Day's Range	46.34 - 47.03	Earnings Date	Oct 25, 2021 - Oct 29, 2021
52 Week Range	32.83 - 51.86	Forward Dividend & Yield	1.56 (3.33%)
Volume	16,516,690	Ex-Dividend Date	Jul 29, 2021
Avg. Volume	31,298,092	1y Target Est	45.86

Fair Value ⓘ ⚙️

XX.XX

-14% Est. Return

🔒 [View details](#)

Overvalued



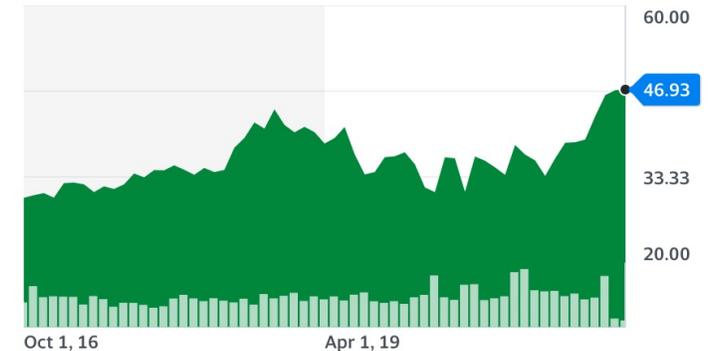
Related Research ⓘ ⚙️

📄 Analyst Report: Pfizer Inc.

📄 Morningstar | A Weekly Summa...

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Chart Events ⓘ ⚙️

Bearish pattern detected

Triple Moving Average Crossover

🔒 [View all chart patterns](#)

Performance Outlook

Short Term 2W - 6W	Mid Term 6W - 9M	Long Term 9M+
↓	↓	↑



BioNTech SE (NasdaqGS: BNTX)

BIONTECH

BioNTech was founded in 2008 on the understanding that every cancer patient's tumor is unique and that in order to effectively address this challenge, we must create individualized treatments for each patient. To realize this vision, we combine decades of groundbreaking research in immunology, cutting-edge therapeutic platforms and a suite of patient profiling and bioinformatic tools to develop immunotherapies for cancer and other diseases. We leverage powerful new therapeutic mechanisms and exploit a diverse array of biological targets to harness the power of each patient's immune system to address the unique molecular signature of each patient's underlying disease. The breadth of our immunotherapy technologies and expertise enables us to develop potential therapies to address a range of rare and infectious diseases, and we rapidly mobilized these to address the COVID-19 pandemic with our COVID-19 vaccine, referred to as COMIRNATY® in the European Union and other locations where we have received marketing approval.

BioNTech SE (NasdaqGS: BNTX)



332.41 +3.88 (+1.18%)

As of 3:20PM EDT. Market open.

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Previous Close	328.53	Market Cap	80.586B
Open	328.49	Beta (5Y Monthly)	N/A
Bid	329.40 x 1400	PE Ratio (TTM)	18.16
Ask	329.82 x 1100	EPS (TTM)	18.29
Day's Range	320.71 - 332.43	Earnings Date	Nov 09, 2021
52 Week Range	54.10 - 464.00	Forward Dividend & Yield	N/A (N/A)
Volume	1,748,717	Ex-Dividend Date	N/A
Avg. Volume	4,019,440	1y Target Est	275.96

Fair Value ⓘ ⓘ
XX.XX
 79% Est. Return
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Undervalued



Related Research ⓘ ⓘ
[Morningstar | A Weekly Summa...](#)
[Analyst Report: BioNTech SE](#)
[View more](#)



Chart Events ⓘ ⓘ
Bearish pattern detected
Momentum
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Performance Outlook

Short Term 2W - 6W	Mid Term 6W - 9M	Long Term 9M+
↓	↑	↑



Moderna, Inc. (NasdaqGS: MRNA)



Moderna is advancing messenger RNA (mRNA) science to create a new class of transformative medicines for patients. mRNA medicines are designed to direct the body's cells to produce intracellular, membrane or secreted proteins that can have a therapeutic or preventive benefit and have the potential to address a broad spectrum of diseases. Moderna's platform builds on continuous advances in basic and applied mRNA science, delivery technology and manufacturing, providing the Company the capability to pursue in parallel a robust pipeline of new development candidates. Moderna is developing therapeutics and vaccines for infectious diseases, immuno-oncology, rare diseases, cardiovascular diseases, and autoimmune and inflammatory diseases, independently and with strategic collaborators.

Moderna, Inc. (NasdaqGS: MRNA)

moderna®

409.50 +11.84 (+2.98%)

As of 3:19PM EDT. Market open.

Summary Company Outlook Chart Conversations Statistics Historical Data Profile Financials Analysis Options

Previous Close	397.66	Market Cap	165.293B
Open	392.71	Beta (5Y Monthly)	1.49
Bid	407.25 x 800	PE Ratio (TTM)	48.38
Ask	407.45 x 1100	EPS (TTM)	8.46
Day's Range	388.68 - 409.665	Earnings Date	Oct 27, 2021 - Nov 01, 2021
52 Week Range	54.21 - 497.49	Forward Dividend & Yield	N/A (N/A)
Volume	10,587,133	Ex-Dividend Date	N/A
Avg. Volume	17,130,795	1y Target Est	286.15

Fair Value

XX.XX

-32% Est. Return

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Related Research

Analyst Report: Moderna, Inc.

Market Update: COST, EL, JNJ, F...

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1D 5D 1M 6M YTD 1Y **5Y** Max Full screen



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Chart Events

Bullish pattern detected

Williams %R

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Performance Outlook

Short Term 2W - 6W	Mid Term 6W - 9M	Long Term 9M+



Johnson & Johnson (NYSE: JNJ)



Johnson & Johnson and its subsidiaries (the Company) have approximately 134,500 employees worldwide engaged in the research and development, manufacture and sale of a broad range of products in the health care field. Johnson & Johnson is a holding company, with operating companies conducting business in virtually all countries of the world. The Company's primary focus is products related to human health and well-being. Johnson & Johnson was incorporated in the State of New Jersey in 1887.

The Company is organized into three business segments: Consumer Health, Pharmaceutical and Medical Devices.

Johnson & Johnson (NYSE: JNJ)



175.08 +0.15 (+0.09%)

As of 3:20PM EDT. Market open.

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Previous Close	174.93	Market Cap	460.934B
Open	175.10	Beta (5Y Monthly)	0.71
Bid	174.99 x 800	PE Ratio (TTM)	26.32
Ask	175.01 x 800	EPS (TTM)	6.65
Day's Range	173.84 - 175.17	Earnings Date	Oct 19, 2021
52 Week Range	133.65 - 179.92	Forward Dividend & Yield	4.24 (2.42%)
Volume	2,173,466	Ex-Dividend Date	Aug 23, 2021
Avg. Volume	5,950,696	1y Target Est	189.61

Fair Value ⓘ ⓘ
XX.XX
 -8% Est. Return
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Overvalued

Related Research ⓘ ⓘ
 Market Update: COST, EL, JNJ, F...
 Analyst Report: Johnson & John...
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1D 5D 1M 6M YTD 1Y **5Y** Max [Full screen](#)



Chart Events ⓘ ⓘ
Bullish pattern detected
Engulfing Line (Bullish)
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Performance Outlook

Short Term 2W - 6W		Mid Term 6W - 9M		Long Term 9M+	
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AstraZeneca PLC (NasdaqGS: AZN)



AstraZeneca (LSE/STO/Nasdaq: AZN) is a global, science-led biopharmaceutical company that focuses on the discovery, development and commercialisation of prescription medicines, primarily for the treatment of diseases in three therapy areas - Oncology, Cardiovascular, Renal & Metabolism and Respiratory & Immunology. AstraZeneca operates in over 100 countries and its innovative medicines are used by millions of patients worldwide.

AstraZeneca PLC (NasdaqGS: AZN)



58.92 -0.67 (-1.12%)

As of 3:21PM EDT. Market open.

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Previous Close	59.59	Market Cap	182.58B
Open	59.15	Beta (5Y Monthly)	0.19
Bid	58.88 x 1000	PE Ratio (TTM)	41.05
Ask	58.89 x 3000	EPS (TTM)	1.44
Day's Range	58.63 - 59.24	Earnings Date	N/A
52 Week Range	46.48 - 60.93	Forward Dividend & Yield	1.40 (2.35%)
Volume	4,248,305	Ex-Dividend Date	Aug 12, 2021
Avg. Volume	10,146,146	1y Target Est	68.58

Fair Value ? +

XX.XX

-10% Est. Return

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Related Research ? +

[Analyst Report: AstraZeneca PLC](#)

[Market Digest: UAA, CENT, AZN](#)

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[YTD](#)
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Chart Events ? +

Bullish pattern detected

Price Crosses Moving Average

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Performance Outlook

Short Term 2W - 6W	Mid Term 6W - 9M	Long Term 9M+
↑	↑	↑



Novavax (NasdaqGS: NVAX)



Novavax, Inc. (Nasdaq: NVAX) is a biotechnology company that promotes improved health globally through the discovery, development and commercialization of innovative vaccines to prevent serious infectious diseases. The company's proprietary recombinant technology platform combines the power and speed of genetic engineering to efficiently produce highly immunogenic nanoparticles designed to address urgent global health needs. Novavax is conducting late-stage clinical trials for NVX-CoV2373, its vaccine candidate against SARS-CoV-2, the virus that causes COVID-19.

Novavax (NasdaqGS: NVAX)



250.26 -8.73 (-3.37%)

As of 3:23PM EDT. Market open.

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Previous Close	258.99	Market Cap	18.617B
Open	254.00	Beta (5Y Monthly)	1.58
Bid	247.21 x 800	PE Ratio (TTM)	N/A
Ask	247.43 x 1800	EPS (TTM)	-13.84
Day's Range	242.55 - 255.48	Earnings Date	Nov 08, 2021 - Nov 12, 2021
52 Week Range	76.59 - 331.68	Forward Dividend & Yield	N/A (N/A)
Volume	3,604,412	Ex-Dividend Date	N/A
Avg. Volume	5,025,349	1y Target Est	264.20

Fair Value ⓘ ⚙️

XX.XX

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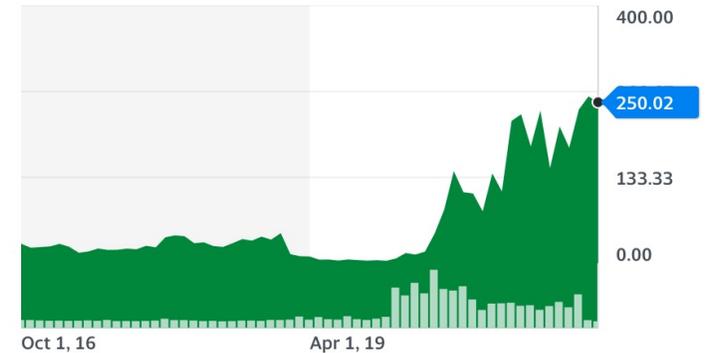
Related Research ⓘ ⚙️

📄 Analyst Report: Pfizer Inc.

📄 Analyst Report: Moderna, Inc.

🔒 [View more](#)

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Chart Events ⓘ ⚙️

Bullish pattern detected

 Commodity Channel Index

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Performance Outlook

Short Term 2W - 6W	Mid Term 6W - 9M	Long Term 9M+
↑	↑	↑

Vaccine Efficacy





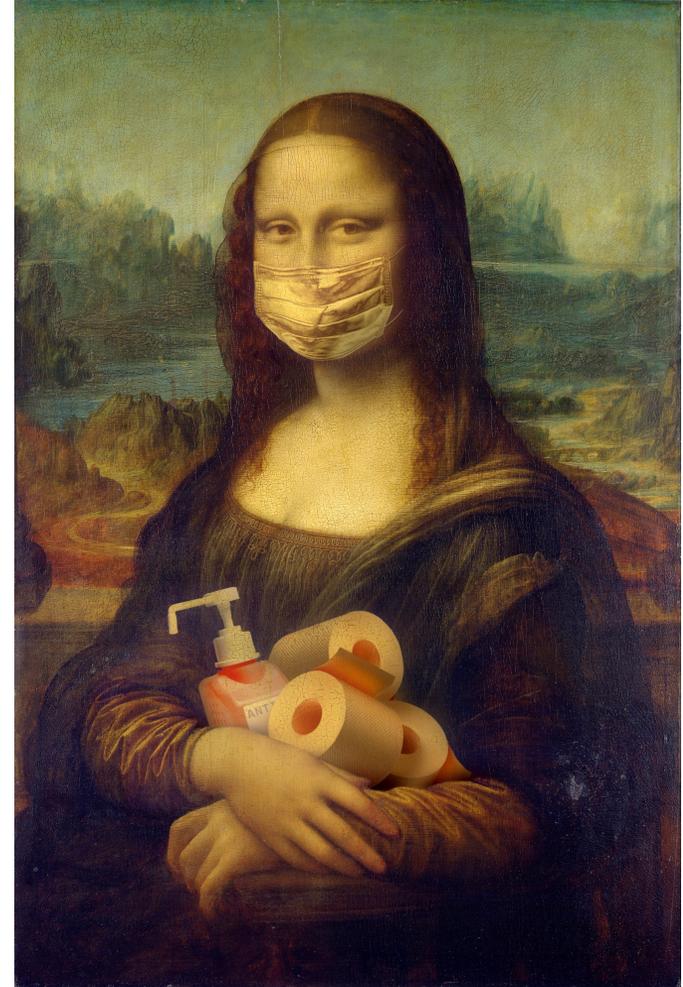
How to Calculate Vaccine Efficacy ?

$$VE = (ARU - ARV) / ARU * 100\%$$

VE = Vaccine efficacy

ARU = Attack rate of unvaccinated people

ARV = Attack rate of vaccinated people





COVID-19 Vaccines Overview

Types of Vaccines	Vaccine Name	Vaccine Efficacy
mRNA Vaccines	Pfizer-BioNTech	95% (People 16 years and older)
	Moderna	94.1% (People 18 years and older)
Viral Vector Vaccines	Johnson & Johnson's Janssen	66.3%
	AstraZeneca/Oxford	63.09%
	Russian Sputnik-V	
Inactivated Vaccines	CanSinoBIO	
	Sinopharm	79%
	Sinovac	51%

Sources: Centers for Disease Control and Prevention. "Information about the Pfizer-BioNTech COVID-19 Vaccine", <https://www.cdc.gov/coronavirus/2019-ncov/vaccines/different-vaccines/Pfizer-BioNTech.html>; "Moderna COVID-19 Vaccine Overview and Safety", <https://www.cdc.gov/coronavirus/2019-ncov/vaccines/different-vaccines/Moderna.html>; "Information About Johnson & Johnson's Janssen COVID-19 Vaccine", <https://www.cdc.gov/coronavirus/2019-ncov/vaccines/different-vaccines/janssen.html>; "The Sinopharm COVID-19 vaccine: What you need to know", <https://www.who.int/news-room/feature-stories/detail/the-sinopharm-covid-19-vaccine-what-you-need-to-know>. "The Sinovac COVID-19 vaccine: What you need to know", <https://www.who.int/news-room/feature-stories/detail/the-sinovac-covid-19-vaccine-what-you-need-to-know>; "The Oxford/AstraZeneca COVID-19 vaccine: what you need to know", <https://www.who.int/news-room/feature-stories/detail/the-oxford-astrazeneca-covid-19-vaccine-what-you-need-to-know>. Accessed Sept. 2, 2021



Children and COVID-19 vaccines

The FDA has given the Pfizer-BioNTech COVID-19 vaccine emergency use authorization for children **ages 12 through 15**.

The Pfizer-BioNTech COVID-19 vaccine requires two injections given 21 days apart. The second dose can be given up to six weeks after the first dose, if needed.

Research has shown that the Pfizer-BioNTech COVID-19 vaccine is **100%** effective in preventing the COVID-19 virus in children ages 12 through 15. Previous research has shown that the vaccine is **95%** effective in preventing the COVID-19 virus with symptoms in people age 16 and older.



Variants and COVID-19 vaccines

In the U.S., the **delta (B.1.617.2) variant** is now the most common COVID-19 variant. It is nearly twice as contagious as earlier variants and might cause more severe illness.

While research suggests that COVID-19 vaccines are slightly less effective against the variants, the vaccines still appear to provide **protection against severe COVID-19**. For example:

Early research from the U.K. suggests that, after full vaccination, the Pfizer-BioNTech COVID-19 vaccine is **88%** effective at preventing **symptomatic COVID-19 virus**. The vaccine is also **96%** effective at preventing **severe disease** with the COVID-19 virus caused by the **delta variant**.

Early research from Canada suggests that, after one dose, the Moderna COVID-19 vaccine is **72%** effective at preventing **symptomatic COVID-19 virus** caused by the **delta variant**. One dose of the vaccine is also **96%** effective at preventing **severe disease** with the COVID-19 virus caused by the delta variant.

The Janssen/Johnson & Johnson COVID-19 vaccine is **85%** effective at preventing **severe disease** with the COVID-19 virus caused by the **delta variant**, according to data released by Johnson & Johnson.



Israel MoH Vaccination Program and Analysis

In January, **Pfizer and the Israel MoH** entered into a collaboration agreement to monitor the real-world impact of the Pfizer-BioNTech COVID-19 Vaccine.

Findings from the analysis were derived from de-identified aggregate Israel MoH surveillance data collected between January 17 and March 6, 2021, when the Pfizer-BioNTech COVID-19 Vaccine was the **only vaccine available in the country** and when the more transmissible B.1.1.7 variant of SARS-CoV-2 (formerly referred to as the U.K. variant) was the dominant strain. Vaccine effectiveness was **at least 97% against symptomatic COVID-19 cases, hospitalizations, severe and critical hospitalizations, and deaths**. Furthermore, the analysis found a vaccine effectiveness of **94% against asymptomatic SARS-CoV-2 infections**. For all outcomes, vaccine effectiveness was measured from two weeks after the second dose.



Explanation About the Effectiveness of the Vaccine for Coronavirus in Israel

The Ministry of Health is continuously monitoring the effectiveness of the vaccine for coronavirus.

As published yesterday (5.7.2021) in the Ministry of Health's announcement, epidemiological analysis by the public health services in the Ministry of Health reveals that starting June 6th, the effectiveness of the vaccine decreased to **64%** in **preventing infection** and **64%** in **preventing symptomatic illness**.

This decrease was observed simultaneously with the spread of the Delta variant in Israel. Nevertheless, the effectiveness of the vaccine in **preventing serious illness and hospitalization** cases is estimated at **93%**.



Things to know before vaccination

	Pfizer-BioNTech	Moderna	Johnson & Johnson's Janssen
Recommended Group	12 years and older	18 years and older	18 years and older
Fully Vaccinated Time	Two weeks after the second shot	Two weeks after the second shot	Two weeks after the shot
Number of shots	2 shots, 21 days apart <u>Some immunocompromised people</u> should get 3 shots	2 shots, 28 days apart <u>Some immunocompromised people</u> should get 3 shots	1 shot

Sources: Centers for Disease Control and Prevention. “Pfizer-BioNTech COVID-19 Vaccine Overview and Safety”, <https://www.cdc.gov/coronavirus/2019-ncov/vaccines/different-vaccines/Pfizer-BioNTech.html>; “Moderna COVID-19 Vaccine Overview and Safety”, <https://www.cdc.gov/coronavirus/2019-ncov/vaccines/different-vaccines/Moderna.html>; “Johnson & Johnson’s Janssen COVID-19 Vaccine Overview and Safety”, <https://www.cdc.gov/coronavirus/2019-ncov/vaccines/different-vaccines/janssen.html>; “When You’ve Been Fully Vaccinated”, <https://www.cdc.gov/coronavirus/2019-ncov/vaccines/fully-vaccinated.html>. Accessed Sept. 3, 2021



Who Needs an Additional COVID-19 Vaccine?

Currently, CDC is recommending that moderately to severely immunocompromised people receive an additional dose. This includes people who have:

- Been receiving active cancer treatment for tumors or cancers of the blood
- Received an organ transplant and are taking medicine to suppress the immune system
- Received a stem cell transplant within the last 2 years or are taking medicine to suppress the immune system
- Moderate or severe primary immunodeficiency (such as DiGeorge syndrome, Wiskott-Aldrich syndrome)
- Advanced or untreated HIV infection
- Active treatment with high-dose corticosteroids or other drugs that may suppress your immune response

People should talk to their healthcare provider about their medical condition, and whether getting an additional dose is appropriate for them.



Local Adverse Reactions (Within 7 Days After Each Dose)

	P-B D1	P-B D2	M D1	M D2	J
	N=2291	N=2098	N=11406	N=10985	N=2036
Pain	83.1%	77.8%	86.9%	89.9%	58.6%
Pain ^b	1%	1.2%	3.2%	4.6%	0.4%

P-B=Pfizer-BioNTech (Participants 18-55 Years of Age) M=Moderna (Participants 18-64 Years) J=Johnson & Johnson's Janssen (Individuals 18 to 59 Years of Age) D1=Dose 1 D2=Dose 2

Pain^b: P-B: Prevents daily activity. M: Defined as any use of prescription pain reliever; prevents daily activity. J: Defined as incapacitating symptoms; inability to do work, school, or usual activities; use of narcotic pain reliever.

Sources: Food and Drug Administration. <https://www.fda.gov/media/144637/download>;
<https://www.fda.gov/media/144413/download>; <https://www.fda.gov/media/146304/download>. Accessed Mar. 31, 2021

Local Adverse Reactions (Within 7 Days After Each Dose)

	P-B D1	P-B D2	M D1	M D2	J
	N=2291	N=2098	N=11406	N=10985	N=2036
Erythema / Redness ^a	4.5%	5.9%	3.0%	8.9%	9%
Erythema /Redness ^b	0.3%	0.5%	0.3%	1.9%	0.3%
Swelling ^a	5.8%	6.3%	6.7%	12.6%	7%
Swelling ^b	0.2%	0.3%	0.5%	1.7%	0.2%

P-B=Pfizer-BioNTech (Participants 18-55 Years of Age) M=Moderna (Participants 18-64 Years) J=Johnson & Johnson's Janssen (Individuals 18 to 59 Years of Age) D1=Dose 1 D2=Dose 2

Erythema/ Redness^a & Swelling^a : P-B: Defined as >2cm M: Defined as ≥ 25 mm J: Defined as ≥ 25 mm

Erythema /Redness^b & Swelling^b : Defined as >100 mm

Sources: Food and Drug Administration. <https://www.fda.gov/media/144637/download>;

<https://www.fda.gov/media/144413/download>; <https://www.fda.gov/media/146304/download>. Accessed Mar. 31, 2021



Systemic Adverse Reactions (Within 7 Days After Each Dose)

	P-B D1	P-B D2	M D1	M D2	J
	N=2291	N=2098	N=11406	N=10985	N=2036
Headache	41.9%	51.7%	35.3%	62.8%	44.4%
Headache ^b	1.0%	3.2%	1.9%	5.0%	0.9%
Fever	3.7%	15.8%	0.9%	17.4%	12.8%
Fever ^b	0.3%	1.2%	<0.1%	1.7%	0.3%

P-B=Pfizer-BioNTech (Participants 18-55 Years of Age) M=Moderna (Participants 18-64 Years) J=Johnson & Johnson's Janssen (Individuals 18 to 59 Years of Age) D1=Dose 1 D2=Dose 2

Headache^b: P-B: Prevents daily activity. M: Defined as significant; any use of prescription pain reliever or prevents daily activity. J: Defined as incapacitating symptoms; requires bed rest and/or results in loss of work, school, or cancellation of social activities; use of narcotic pain reliever.

Fever^b: P-B: Defined as >38.9°C to 40.0°C M: Defined as ≥39.0–≤40.0°C/≥102.1–≤104.0°F J: Defined as 39.0°C - 40.0°C

Sources: Food and Drug Administration. <https://www.fda.gov/media/144637/download>;

<https://www.fda.gov/media/144413/download>; <https://www.fda.gov/media/146304/download>. Accessed Mar. 31, 2021



Systemic Adverse Reactions (Within 7 Days After Each Dose)

	P-B D1	P-B D2	M D1	M D2	J
	N=2291	N=2098	N=11406	N=10985	N=2036
Fatigue ^a	47.4%	59.4%	38.4%	67.6%	43.8%
Fatigue ^b	1.4%	4.6%	1.1%	10.7%	1.2%
Myalgia ^a	21.3%	37.3%	23.7%	61.6%	39.1%
Myalgia ^b	0.6%	2.2%	0.6%	10.1%	1.4%

P-B=Pfizer-BioNTech (Participants 18-55 Years of Age) M=Moderna (Participants 18-64 Years) J=Johnson & Johnson's Janssen (Individuals 18 to 59 Years of Age) D1=Dose 1 D2=Dose 2 Myalgia: Muscle Pain

Fatigue^b & Myalgia^b: P-B: Prevents daily activity. M: Defined as significant; prevents daily activity. J: Defined as incapacitating symptoms; requires bed rest and/or results in loss of work, school, or cancellation of social activities; use of narcotic pain reliever.

Sources: Food and Drug Administration. <https://www.fda.gov/media/144637/download>;

<https://www.fda.gov/media/144413/download>; <https://www.fda.gov/media/146304/download>. Accessed Mar. 31, 2021



Systemic Adverse Reactions (Within 7 Days After Each Dose)

	P-B D1	P-B D2	M D1	M D2	J
	N=2291	N=2098	N=11406	N=10985	N=2036
Nausea/ Vomiting ^a	1.2%	1.9%	9.4%	21.4%	15.5%
Nausea/ Vomiting ^b	0	0.2%	<0.1%	<0.1%	0.1%

P-B=Pfizer-BioNTech (Participants 18-55 Years of Age) M=Moderna (Participants 18-64 Years) J=Johnson & Johnson's Janssen (Individuals 18 to 59 Years of Age) D1=Dose 1 D2=Dose 2

Nausea/Vomiting^b: P-B: Vomiting: Requires intravenous hydration. M: Nausea/Vomiting: Defined as prevents daily activity, requires outpatient intravenous hydration. J: Nausea: Defined as incapacitating symptoms; requires bed rest and/or results in loss of work, school, or cancellation of social activities; use of narcotic pain reliever.

Sources: Food and Drug Administration. <https://www.fda.gov/media/144637/download>;
<https://www.fda.gov/media/144413/download>; <https://www.fda.gov/media/146304/download>. Accessed Mar. 31, 2021



Systemic Adverse Reactions (Within 7 Days After Each Dose)

	P-B D1	P-B D2	M D1	M D2	J
	N=2291	N=2098	N=11406	N=10985	N=2036
Use of antipyretic or pain medication	27.8%	45.0%	23.3%	57.3%	26.4%

P-B=Pfizer-BioNTech (Participants 18-55 Years of Age) M=Moderna (Participants 18-64 Years) J=Johnson & Johnson's Janssen (Individuals 18 to 59 Years of Age) D1=Dose 1 D2=Dose 2

Sources: Food and Drug Administration. <https://www.fda.gov/media/144637/download>;
<https://www.fda.gov/media/144413/download>; <https://www.fda.gov/media/146304/download>. Accessed Mar. 31, 2021

Related Companies





Catalent, Inc. (NYSE: CTLT)

Catalent®

Catalent is the leading global provider of advanced delivery technologies, development, and manufacturing solutions for drugs, biologics, cell and gene therapies, and consumer health products. With over 85 years serving the industry, Catalent has proven expertise in bringing more customer products to market faster, enhancing product performance and ensuring reliable global clinical and commercial product supply.

A collaboration with the Janssen Pharmaceutical Companies of Johnson & Johnson, whereby Catalent's Biologics business unit will accelerate availability of manufacturing capacity and prepare for large-scale commercial manufacturing at its facility in Bloomington, Indiana of Johnson & Johnson's lead vaccine candidate for COVID-19.

A collaboration for large-scale, commercial fill-finish manufacturing of Moderna's mRNA-based COVID-19 vaccine candidate (mRNA-1273) at Catalent's biologics facility in Bloomington, Indiana.

Catalent, Inc. (NYSE: CTLT)

Catalent®

140.65 +1.05 (+0.76%)

As of 3:40PM EDT. Market open.

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Previous Close	139.60	Market Cap	24.024B
Open	139.14	Beta (5Y Monthly)	1.42
Bid	140.43 x 1000	PE Ratio (TTM)	45.23
Ask	140.47 x 1000	EPS (TTM)	3.11
Day's Range	137.75 - 140.71	Earnings Date	Nov 01, 2021 - Nov 05, 2021
52 Week Range	79.65 - 140.71	Forward Dividend & Yield	N/A (N/A)
Volume	851,342	Ex-Dividend Date	N/A
Avg. Volume	760,490	1y Target Est	140.91

Fair Value ⓘ ⚙️

XX.XX

-17% Est. Return

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Overvalued



Related Research ⓘ ⚙️

📄 Analyst Report: Catalent Inc.

📄 Market Update: ILMN, ADTN, K...

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Trade prices are not sourced from all markets

Chart Events ⓘ ⚙️

Bullish pattern detected

Short-term KST

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Performance Outlook

Short Term 2W - 6W	Mid Term 6W - 9M	Long Term 9M+
↑	↑	↑

Croda International Plc (OTC: COIHF; LSE: CRDA)

CRODA

We (Croda International Plc) create, make and sell speciality chemicals that deliver real benefits to a range of diverse products including health and beauty, engine lubricants, plastics and many more.

Croda International Plc, the speciality chemical company that uses smart science to create high performance ingredients and technologies that improve lives, announces that it has recently entered into an agreement with Pfizer Inc. to supply novel excipients used in the manufacture of a COVID-19 vaccine candidate. The contract with Pfizer runs for five years and awards Croda an initial supply contract for four component excipients used in the production of the vaccine candidate for the first three years of the contract. Demand remains subject to relevant approvals.

Croda International Plc (OTC: COIHF; LSE: CRDA)

CRODA

125.05 0.00 (0.00%)

As of August 27 9:58AM EDT. Market open.

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Previous Close	125.05	Market Cap	17.798B
Open	125.05	Beta (5Y Monthly)	0.51
Bid	0.00 x 0	PE Ratio (TTM)	49.92
Ask	0.00 x 0	EPS (TTM)	2.51
Day's Range	125.05 - 125.05	Earnings Date	N/A
52 Week Range	76.85 - 125.05	Forward Dividend & Yield	1.32 (1.06%)
Volume	98	Ex-Dividend Date	Sep 09, 2021
Avg. Volume	87	1y Target Est	N/A

Fair Value ? +

XX.XX

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N/A

Related Research ? +

[Analyst Report: FMC Corporation](#)

[CE: Raising target price to \\$158....](#)

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Chart Events ? +

Neutral pattern detected

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Performance Outlook

Short Term 2W - 6W	Mid Term 6W - 9M	Long Term 9M+
-----------------------	---------------------	------------------

Lonza Group AG (OTC: LZAGY; SIX: LONN; SGX: O6Z)



Lonza is a leading global provider of integrated healthcare solutions. We focus on enabling treatments that prevent illness, support healthier lifestyles and create a healthy environment. We optimize scientific innovation and manufacturing technology to enable our customers to serve their patients and consumers.

A 10-year strategic collaboration agreement to enable larger scale manufacture of Moderna's mRNA vaccine (mRNA-1273) against the novel coronavirus (SARS-CoV-2) and additional Moderna products in the future.

Lonza Group AG (OTC: LZAGY; SIX: LONN; SGX: O6Z)

Lonza

84.16 -0.60 (-0.71%)

As of 3:27PM EDT. Market open.

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Previous Close	84.76	Market Cap	62.579B
Open	83.89	Beta (5Y Monthly)	0.37
Bid	0.00 x 0	PE Ratio (TTM)	80.94
Ask	0.00 x 0	EPS (TTM)	1.04
Day's Range	83.69 - 84.30	Earnings Date	N/A
52 Week Range	55.69 - 86.31	Forward Dividend & Yield	0.33 (0.39%)
Volume	23,388	Ex-Dividend Date	May 10, 2021
Avg. Volume	81,544	1y Target Est	N/A

Fair Value ⓘ ⚙

XX.XX

N/A

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Related Research ⓘ ⚙

📄 Analyst Report: Catalent Inc.

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Chart Events ⓘ ⚙

Neutral pattern detected

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Performance Outlook

Short Term 2W - 6W	Mid Term 6W - 9M	Long Term 9M+
-----------------------	---------------------	------------------

Roche Holding AG (SIX: ROG; OTCQX: RHHBY)



Roche is a global pioneer in pharmaceuticals and diagnostics focused on advancing science to improve people's lives. The combined strengths of pharmaceuticals and diagnostics under one roof have made Roche the leader in personalised healthcare – a strategy that aims to fit the right treatment to each patient in the best way possible.

Roche announced a partnership with Moderna Inc. to utilise the Elecsys® Anti-SARS-CoV-2 S antibody test in Moderna's mRNA-1273 vaccine research trials. This will facilitate the quantitative measurement of SARS-CoV-2 antibodies and help to establish a correlation between vaccine-induced protection and levels of anti-receptor binding domain (RBD) antibodies.

This partnership with Moderna, started by using the Elecsys Anti-SARS-CoV-2 test for qualitative determination of anti-N SARS-CoV-2 antibodies. This has been part of Moderna's vaccine trials for baselining and assessing natural infection in trial participants.

Roche Holding AG (SIX: ROG; OTCQX: RHHBY)



49.81 -0.03 (-0.06%)

As of 3:30PM EDT. Market open.

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Previous Close	49.84	Market Cap	348.147B
Open	49.75	Beta (5Y Monthly)	0.27
Bid	N/A x N/A	PE Ratio (TTM)	22.46
Ask	N/A x N/A	EPS (TTM)	2.22
Day's Range	49.57 - 49.94	Earnings Date	N/A
52 Week Range	39.72 - 51.05	Forward Dividend & Yield	1.22 (2.45%)
Volume	586,414	Ex-Dividend Date	Mar 18, 2021
Avg. Volume	1,170,410	1y Target Est	50.90

Fair Value ⓘ ⚙

XX.XX

N/A

[View details](#)

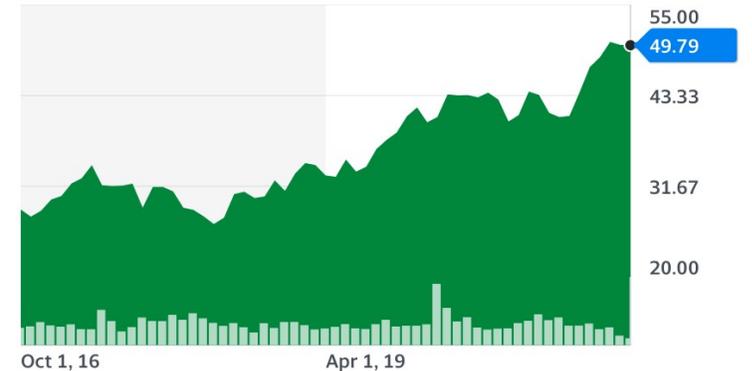
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Chart Events ⓘ ⚙

Neutral pattern detected

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Performance Outlook

Short Term 2W - 6W	Mid Term 6W - 9M	Long Term 9M+
-----------------------	---------------------	------------------

Sanofi (Euronext: SAN; NasdaqGS: SNY)



Sanofi is dedicated to supporting people through their health challenges. We are a global biopharmaceutical company focused on human health. We prevent illness with vaccines, provide innovative treatments to fight pain and ease suffering. We stand by the few who suffer from rare diseases and the millions with long-term chronic conditions.

Sanofi will provide BioNTech access to its established infrastructure and expertise to produce over 125 million doses of COVID-19 vaccine in Europe. Initial supplies will originate from Sanofi's production facilities in Frankfurt from summer of 2021.

Once authorized, Sanofi will provide Johnson & Johnson access to the established infrastructure and expertise of its vaccine manufacturing plant in Marcy l'Etoile, France, to formulate and fill vials of Janssen's COVID-19 vaccine candidate in 2021, at a rate of approximately 12 million doses per month.

Sanofi (Euronext: SAN; NasdaqGS: SNY)



52.14 -0.46 (-0.87%)

As of 3:46PM EDT. Market open.

Summary Company Outlook Chart Conversations Statistics Historical Data Profile Financials Analysis Options

Previous Close	52.60	Market Cap	130.891B
Open	52.17	Beta (5Y Monthly)	0.40
Bid	52.14 x 1100	PE Ratio (TTM)	19.11
Ask	52.15 x 800	EPS (TTM)	2.73
Day's Range	51.87 - 52.34	Earnings Date	N/A
52 Week Range	44.76 - 54.26	Forward Dividend & Yield	1.93 (3.67%)
Volume	1,421,702	Ex-Dividend Date	May 03, 2021
Avg. Volume	1,765,653	1y Target Est	63.40

Fair Value

XX.XX

-14% Est. Return

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Weekly Stock List

The Argus High-Yield Model Por...

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Chart Events

Neutral pattern detected

Gap Up

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Performance Outlook

Short Term 2W - 6W	Mid Term 6W - 9M	Long Term 9M+
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Takeda Pharmaceutical Company Limited (TSE: 4502; NYSE: TAK)



Takeda focuses its R&D efforts on four core therapeutic areas: Oncology, Rare Genetic and Hematology, Neuroscience and Gastroenterology, with targeted investments in Plasma-Derived Therapies and Vaccines. We are focusing on targeted patient populations in areas of high unmet need, where there is potential for greater therapeutic benefit.

Takeda previously announced its commitment to providing rapid and sustained access to COVID-19 vaccines in Japan through partnerships with Novavax and Moderna. Takeda will receive a manufacturing technology transfer from Novavax and will be responsible for the development and commercialization based on manufacturing capacity of over 250 million doses. The company will also import and distribute 50 million doses of Moderna's mRNA COVID-19 vaccine as part of a joint partnership with Moderna and the Government of Japan's Ministry of Health Labour and Welfare (MHLW).

Takeda Pharmaceutical Company Limited (TSE: 4502; NYSE: TAK)



16.97 +0.25 (+1.47%)

As of 3:46PM EDT. Market open.

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Previous Close	16.72	Market Cap	53.462B
Open	16.90	Beta (5Y Monthly)	1.12
Bid	16.97 x 4000	PE Ratio (TTM)	13.65
Ask	16.98 x 1100	EPS (TTM)	1.24
Day's Range	16.85 - 16.98	Earnings Date	N/A
52 Week Range	15.30 - 19.97	Forward Dividend & Yield	0.84 (5.01%)
Volume	1,134,993	Ex-Dividend Date	Mar 30, 2021
Avg. Volume	1,805,426	1y Target Est	2,386.78

Fair Value ? +
XX.XX Near Fair Value
 4% Est. Return
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Related Research ? +
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Chart Events ? +
Bullish pattern detected
Price Crosses Moving Average
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Performance Outlook

Short Term 📈 2W - 6W	Mid Term 📉 6W - 9M	Long Term 📉 9M+
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