Comunidad de Madrid

# Vacunas COVID-19

Diciembre 2020

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# Generalidades

- Eficacia de las vacunas RNA (Pfizer-BioNTech y Moderna)
  - 90%
- Eficacia de vacuna de vector viral no replicante-DNA (Oxford-Astra Zeneca)
  - 70%
- Las tres estimulan especificidad frente a la proteína S (spike) y han demostrado en los ensayos en fase I y II la producción de anticuerpos neutralizantes e inmunidad celular mediada por células T.
- Las tres sugieren protección clínica frente a la infección por SARS-CoV-2

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# Generalidades

- Vacunas ya autorizadas por la FDA y el NIH
  - Pfizer-BioNTech COVID-19

- Vacunas en ensayos en  fase 3
  - AstraZeneca's COVID-19
  - Janssen's COVID-19
  - Moderna's COVID-19

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# Inmunidad celular

- Producción de **IFN gamma** por LT CD4+ y CD8+
  - Se puede detectar por técnicas como ELISpot

- Se ha comprobado **actividad de células T hasta 75 días después** de infección detectada por PCR en pacientes sin anticuerpos sugiriendo la importancia de las células T de memoria

- Se ha demostrado una **duración de la inmunidad mediada por células T de al menos 6 meses**, mayor incluso que la mediada por anticuerpos (años en casos de SARS-CoV-1 y MERS-CoV)

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# Tipos de vacunas

## VACUNÓMETRO COVID-19 (@donni_69)

| Nombre | BNT162b2 | ARNm-1273 | CVnCoV | - | NVX-CoV2373 | AZD1222 | - | Ad26.COV2-S | Sputnik V | CoronoVac | BBIBP-CorV |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Laboratorio / Institución** | Pfizer BIONTECH FOSUN PHARMA 复星医药 | moderna | CUREVAC the RNA people | SANOFI gsk GlaxoSmithKline | NOVAVAX | AstraZeneca UNIVERSITY OF OXFORD | CanSinoBIO Instituto BioTech Beijing | janssen Johnson & Johnson | THE GAMALEYA NATIONAL CENTER | sinovac | SINOPHARM Instituto Prod. Biológicos Beijing |
| **Nacionalidad** | | | | | | | | | | | |
| **Tipo** | RNA mensajero | RNA mensajero | RNA mensajero | Subunidad de proteína | Subunidad de proteína | Vector viral no replicante | Vector viral no replicante | Vector viral no replicante | Vector viral no replicante | Virus inactivado | Virus inactivado |
| **Administración** | Intramuscular | Intramuscular | Intramuscular | Intramuscular | Intramuscular | Intramuscular | Intramuscular | Intramuscular | Intramuscular | Intramuscular | Intramuscular |
| **Número de dosis** | 2 | 2 | 2 | 2 | 2 | 2 | 1 | 2 | 2 | 2 | 2 |
| **Intervalo dosis** | 28d | 28d | 28d | 21d | 21d | 28d | - | 56d | 21d | 14d | 21d |
| **Fse actual** | III | III | II | II | III | III | III | III | III | III | III |
| **Fase I** | https://www.nejm.org/doi/full/10.1056/NEJMoa2027906 | https://www.nejm.org/doi/full/10.1056/NEJMoa2028436 | No publicado | No publicado | https://www.nejm.org/doi/full/10.1056/NEJMoa2026920 | https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(20)31604-4/fulltext | https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(20)31208-3/fulltext | No publicado | https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(20)31866-3/fulltext#%20 | No publicado | https://www.thelancet.com/journals/laninf/article/PIIS1473-3099(20)30831-8/fulltext |
| **Fase II** | https://www.nature.com/articles/s41586-020-2639-4 https://www.nature.com/articles/s41586-020-2814-7 | No publicado | No publicado | No publicado | No publicado | No publicado | https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(20)31605-6/fulltext | No publicado | No publicado | No publicado | No publicado |
| **Fase III** | Publicado | No publicado | No publicado | No publicado | No publicado | No publicado | No publicado | No publicado | No publicado | No publicado | No publicado |
| **Eficacia Fase III** | 95% (preliminar) | 95% (preliminar) | | | | 70% (preliminar) | | | | | |
| **Conservación** | -80ºC 5d en nevera | -20ºC 30d en nevera | | | | 2-8ºC 6 meses | | | | | |
| **Precio** | ¿? Cara | ¿? Cara | ¿? | ¿? | ¿? | ¿? Barata Sin ánimo de lucro | ¿? | ¿? | ¿? | ¿? | ¿? |
| **Dosis que UE ha comprado** | 300 millones | 160 millones | 405 millones | 300 millones | - | 400 millones | - | 400 millones | - | - | - |

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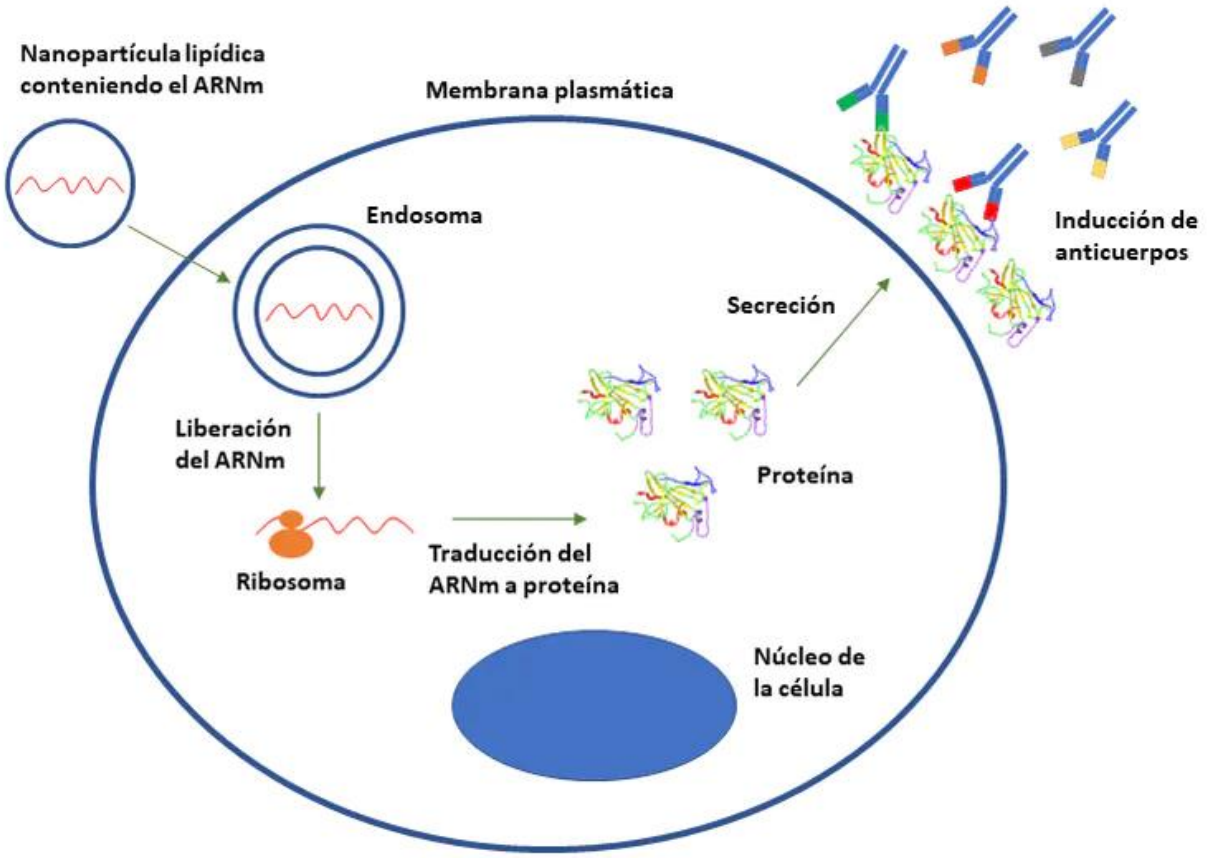
# Vacunas RNA

Se usa una molécula de ARN mensajero que lleva las instrucciones para fabricar la proteína S del virus



# Vacuna Pfizer-BioNTech

The NEW ENGLAND JOURNAL of MEDICINE

RESEARCH SUMMARY

## Safety and Efficacy of the BNT162b2 mRNA Covid-19 Vaccine

F.P. Polack, et al. DOI: 10.1056/NEJMoa2034577

### CLINICAL PROBLEM

Safe and effective vaccines to prevent severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infection and Covid-19 are urgently needed. No vaccines that protect against betacoronaviruses are currently available, and mRNA-based vaccines have not been widely tested.

### CLINICAL TRIAL

A randomized, double-blind study of an mRNA vaccine encoding the SARS-CoV-2 spike protein.

43,548 participants ≥16 years old were assigned to receive the vaccine or placebo by intramuscular injection on day 0 and day 21. Participants were followed for safety and for the development of symptomatic Covid-19 for a median of 2 months.

### RESULTS

**Safety:**
Vaccine recipients had local reactions (pain, erythema, swelling) and systemic reactions (e.g., fever, headache, myalgias) at higher rates than placebo recipients, with more reactions following the second dose. Most were mild to moderate and resolved rapidly.

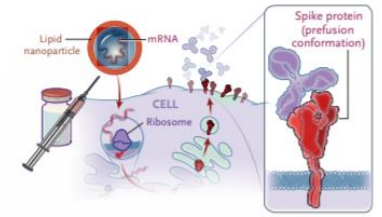
**Efficacy:**
The vaccine showed some early protection 12 days after the first dose; 7 days after the second dose, 95% efficacy was observed.

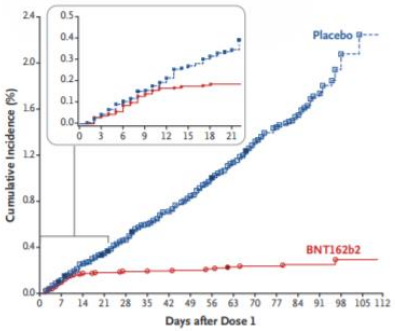
### LIMITATIONS AND REMAINING QUESTIONS

Further study is required to understand the following:

- Safety and efficacy beyond 2 months and in groups not included in this trial (e.g., children, pregnant women, and immunocompromised persons).
- Whether the vaccine protects against asymptomatic infection and transmission to unvaccinated persons.
- How to deal with those who miss the second vaccine dose.

**Links:** Full article | NEJM QuickTake | Editorial




| | BNT162b2 Vaccine | Placebo |
|---|---|---|
| Symptomatic Covid-19 | 8 | 162 |
| | N=18198 | N=18325 |
| Severe Covid-19 | 1 | 9 |
| | N=21669 | N=21686 |

**Vaccine efficacy of 95% (95% credible interval, 90.3–97.6%)**

### CONCLUSIONS

Two doses of an mRNA-based vaccine were safe over a median of two months and provided 95% protection against symptomatic Covid-19 in persons 16 years of age or older.


Estudio randomizado, doble ciego

43548 participantes: placebo vs vacuna IM días 0 y 21

Seguimiento: mediana de 2 meses

**Eficacia:**

Cierta protección a los 12 días

7 días después de segunda dosis 95%

# Vacuna Pfizer-BioNTech

The NEW ENGLAND JOURNAL of MEDICINE

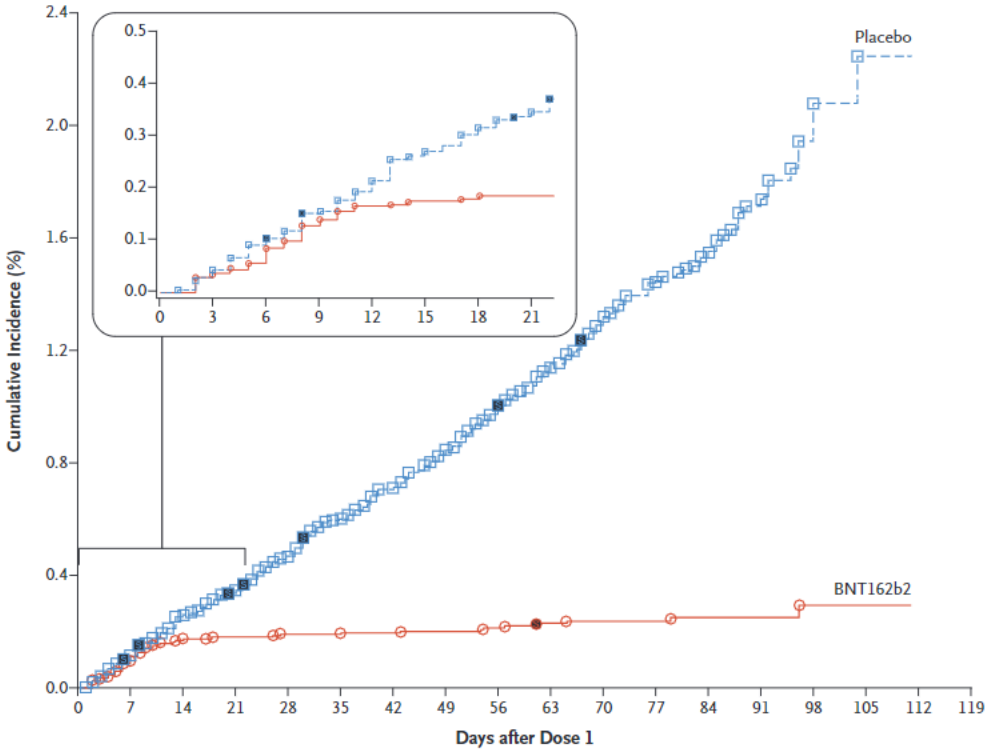
ORIGINAL ARTICLE

## Safety and Efficacy of the BNT162b2 mRNA Covid-19 Vaccine

**Table 2. Vaccine Efficacy against Covid-19 at Least 7 days after the Second Dose.***

| Efficacy End Point | BNT162b2 | | Placebo | | Vaccine Efficacy, % (95% Credible Interval)‡ | Posterior Probability (Vaccine Efficacy >30%)§ |
|---|---|---|---|---|---|---|
| | No. of Cases | Surveillance Time (n)† | No. of Cases | Surveillance Time (n)† | | |
| | | (N=18,198) | | (N=18,325) | | |
| Covid-19 occurrence at least 7 days after the second dose in participants without evidence of infection | 8 | 2.214 (17,411) | 162 | 2.222 (17,511) | 95.0 (90.3–97.6) | >0.9999 |
| | | (N=19,965) | | (N=20,172) | | |
| Covid-19 occurrence at least 7 days after the second dose in participants with and those without evidence of infection | 9 | 2.332 (18,559) | 169 | 2.345 (18,708) | 94.6 (89.9–97.3) | >0.9999 |

* The total population without baseline infection was 36,523; total population including those with and those without prior evidence of infection was 40,137.
† The surveillance time is the total time in 1000 person-years for the given end point across all participants within each group at risk for the end point. The time period for Covid-19 case accrual is from 7 days after the second dose to the end of the surveillance period.
‡ The credible interval for vaccine efficacy was calculated with the use of a beta-binomial model with prior beta (0.700102, 1) adjusted for the surveillance time.
§ Posterior probability was calculated with the use of a beta-binomial model with prior beta (0.700102, 1) adjusted for the surveillance time.




| Efficacy End-Point Subgroup | BNT162b2, 30 μg (N=21,669) | | Placebo (N=21,686) | | VE (95% CI) |
|---|---|---|---|---|---|
| | No. of participants | Surveillance time person-yr (no. at risk) | No. of participants | Surveillance time person-yr (no. at risk) | percent |
| Covid-19 occurrence | | | | | |
| After dose 1 | 50 | 4.015 (21,314) | 275 | 3.982 (21,258) | 82.0 (75.6–86.9) |
| After dose 1 to before dose 2 | 39 | | 82 | | 52.4 (29.5–68.4) |
| Dose 2 to 7 days after dose 2 | 2 | | 21 | | 90.5 (61.0–98.9) |
| ≥7 Days after dose 2 | 9 | | 172 | | 94.8 (89.8–97.6) |

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# Efectos secundarios Vacuna Pfizer-BioNTech

- **Muy común: puede afectar a más de 1 de cada 10 personas**
  - Dolor en el lugar de la inyección
  - Cansancio
  - Dolor de cabeza
  - Dolor muscular
  - Escalofríos
  - Dolor de las articulaciones
  - Fiebre
- **Poco común: puede afectar hasta 1 de cada 100 personas**
  - Ganglios linfáticos agrandados
- **Graves: reacción alérgica**
  - Urticaria (bultos en la piel que suelen producir mucha picazón)
  - Hinchazón de la cara, la lengua o la garganta
  - Dificultad para respirar

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# Vacuna MODERNA

moderna

**Moderna Announces Primary Efficacy Analysis in Phase 3 COVE Study for Its COVID-19 Vaccine Candidate and Filing Today with U.S. FDA for Emergency Use Authorization**

November 30, 2020

Datos de la compañía

- Análisis de eficacia Primaria del estudio COVE Fase 3
- 30,000 participantes
- 2 meses de seguimiento post vacunación
- 196 casos de COVID-19 (30 graves)
- Eficacia del 94.1%;
- Ausencia de efectos secundarios graves

| | mRNA 1273 | Placebo |
|---|---|---|
| Casos | 11 | 185 |
| Casos graves | 0 | 30 |
| Eficacia | 94% | |

| | |
|---|---|
| 2 dosis<br>28 días | Conservación<br>a -20ºC |


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