



Teknik Diagnosis COVID – 19 : Rapid Antigen



Rizka Oktarianti Ainun Jariah S.Si.,M.Sc
Prodi DIII Teknologi Laboratorium Medis



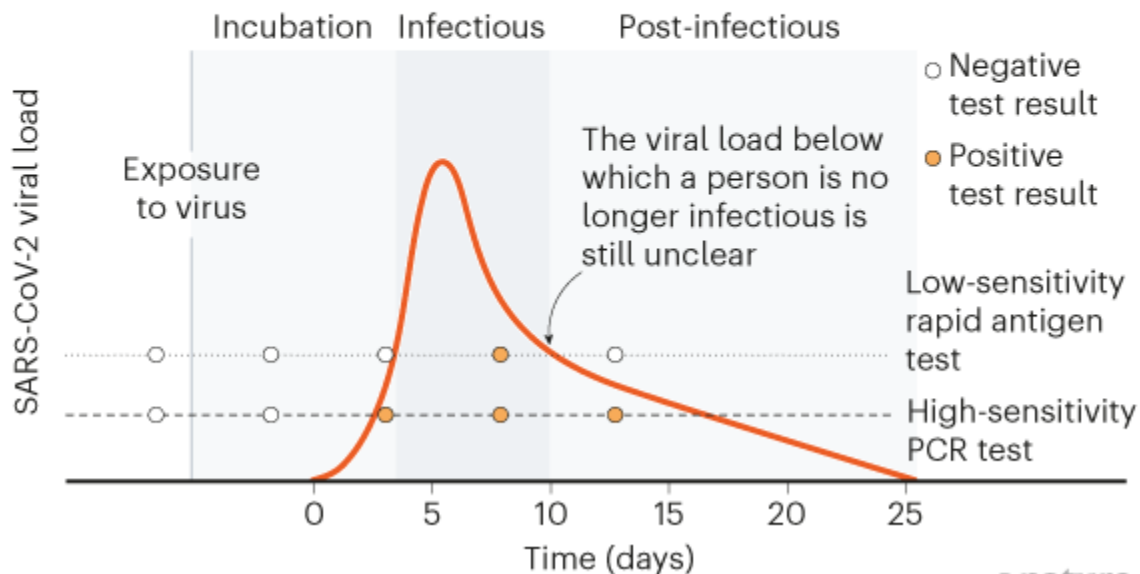
Course Objectives

- ① Mampu memahami dan menjelaskan perbedaan rapid antigen dan antibodi
- ① Mampu memahami dan menjelaskan prinsip pemeriksaan rapid antigen

CATCHING COVID-19

During a SARS-CoV-2 infection, the amount of virus in the body rises and falls. PCR-based tests can pick up small amounts of viral genetic material, so can be positive even after a person stops being infectious.

Rapid antigen tests detect the presence of viral proteins and can be positive when a person is most infectious.



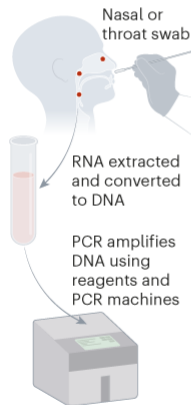
HOW COVID-19 TESTS WORK

Two kinds of coronavirus test look for viral material.
A third examines the immune response to infection.

Nucleic-acid-based test

How it works

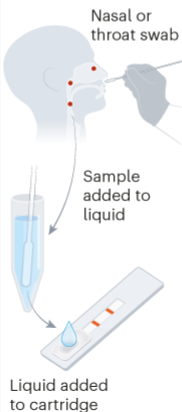
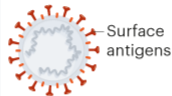
Detects viral genetic material.



Usually requires a centralized laboratory; some machines can be brought to test sites. Variations include LAMP, CRISPR and sequencing-based tests that amplify and detect DNA in a range of ways.

Antigen test

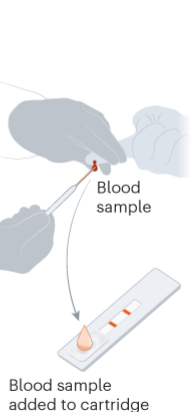
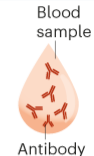
Detects proteins on surface of the virus.



Point-of-care test that can be done by non-experts.

Antibody test (serological)

Detects antibodies that the immune system produces against the virus.



Point-of-care test that can be done by non-experts.

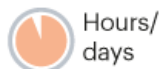
What a test tells you

Whether any viral genetic material is present, even at low levels.

Whether the virus is present in high concentrations. (Whether you are likely to be infectious.)

Whether you are likely to have had the virus. It does not detect an active infection.

Time and cost



Minutes



Minutes



General reliability*

Very sensitive and specific.

Misses infections with low virus levels.

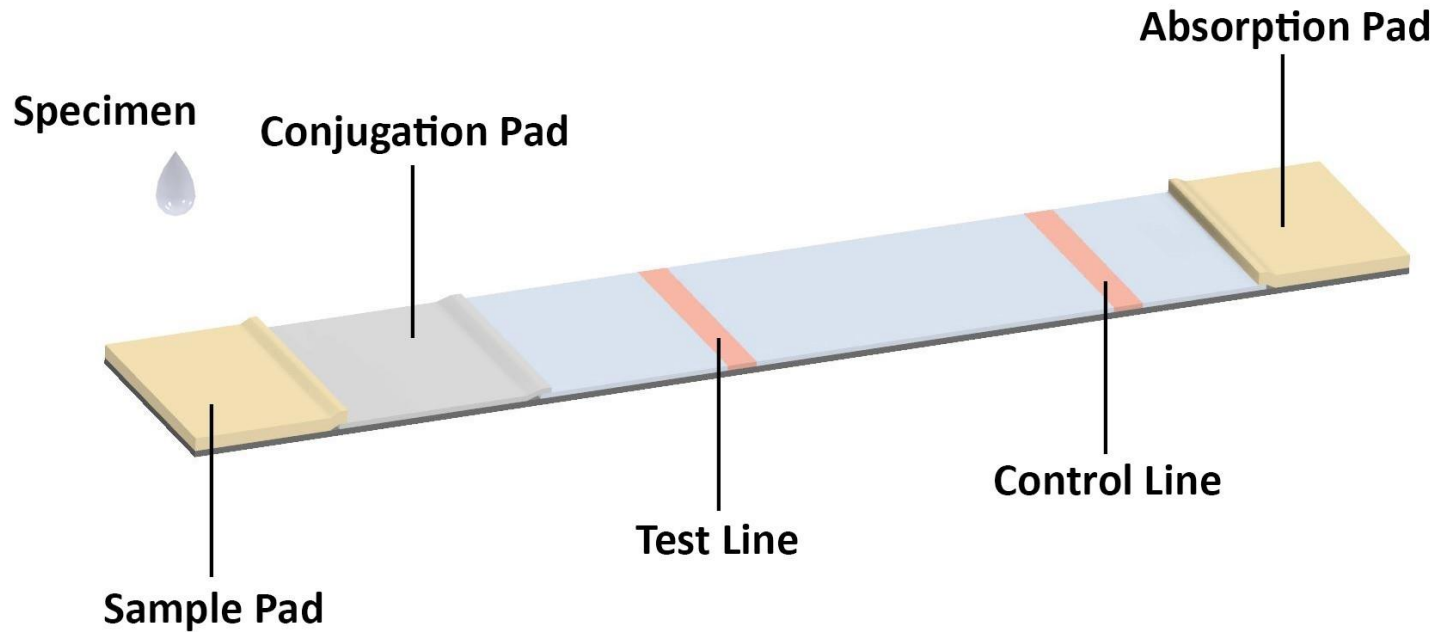
Variable, but some tests are very specific.

*The chance that a test result is a true positive or a true negative depends not only on a test's own reliability, but also on background rates of infection, and on whether a person shows symptoms.



Prinsip Kerja

- ⦿ Mendeteksi protein pada permukaan virus
- ⦿ Tergantung merk alat RDT, memiliki sensitivitas 70 – 100 % dan spesifisitas 99%

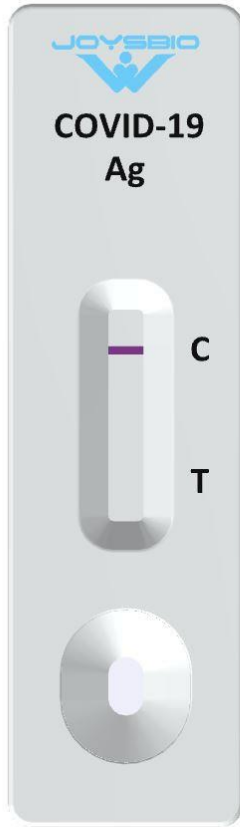


Conjugation Pad: SARS-CoV-2 Nucleoprotein Antibody (rabbit MAb) and chicken IgY

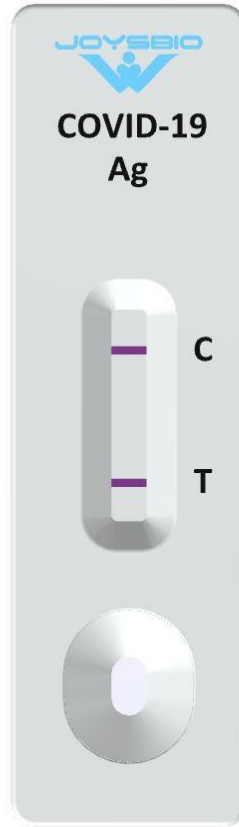
Test Line: SARS-CoV-2 Nucleoprotein Antibody (rabbit MAb)

Control Line: Goat anti-chicken IgY





Negative



Positive



Invalid



Invalid



(+)

- ⦿ Relatif lebih murah dibandingkan dengan PCR
- ⦿ Cepat
- ⦿ Dapat digunakan untuk *screening* pada komunitas yang memiliki positif kasus

(-)

- ⦿ Memiliki sensitivitas lebih rendah dibanding PCR
- ⦿ Tidak dapat digunakan untuk mengkonfirmasi kasus tanpa gejala , rentan negative palsu



References :

- ① <https://www.nature.com/articles/d41586-021-00332-4>
- ② [https://www.who.int/indonesia/news/detail/08-12-2020-implementation-of-antigen-rdt-\(ag-rdt\)-to-detect-covid-19-cases-in-indonesia](https://www.who.int/indonesia/news/detail/08-12-2020-implementation-of-antigen-rdt-(ag-rdt)-to-detect-covid-19-cases-in-indonesia)
- ③ **COVID-19: Rapid antigen detection for SARS-CoV-2 by lateral flow assay: A national systematic evaluation of sensitivity and specificity for mass-testing.** Peto, TimAffron, Dominic et al. EClinicalMedicine, Volume 36, 100924 DOI: <https://doi.org/10.1016/j.eclinm.2021.100924>



Thank you.

