



# Mansoura National University Faculty of Medicine

## Level: 2

## Semester: 4



# Pregnancy Test





# Contents

1. Pregnancy test: Definition & substance detected
2. Specimens used for pregnancy test
3. Pregnancy test by Strips or Cassette: principle & procedure
4. Interpretation of the results of pregnancy test



# Learning Outcomes (LOs)



**At the end of this section, the students should be able to:**

Identify concept of pregnancy test & the substance detected

State the specimens of choice for a pregnancy test

Discuss the principle & procedure of pregnancy test by Strips or Cassette

Interpret the results of pregnancy test



# Case scenario (Clinical correlate)



A 38-year-old female came to her physician with a history of nausea, vomiting, and missed period. The urine sample was obtained 3 weeks after the missed menstruation. A urine pregnancy test was performed with the following result:

**Interpret the pregnancy test result**



# Pregnancy Test

- **Pregnancy tests are used to determine whether a female is pregnant or not. They are based on the detection of human chorionic gonadotropin (hCG).**

**hCG is a hormone secreted during pregnancy by the placenta shortly after fertilization and it reaches detectable levels in urine and serum about 1 week after implantation (*attachment of the early embryo to the uterine lining*).**

**Levels of hCG continue to rise during the first trimester of pregnancy, making it an excellent marker for pregnancy.**

# Specimens

- **The two main types of pregnancy tests are urine tests and blood tests.**
- **Both tests detect the presence of human chorionic gonadotropin (hCG).**

# Urine tests

- Urine specimen must be collected without preservatives in a **clean dry container**.
- **First morning urine** usually contains the **highest concentration of hCG**, however, urine collected at any time during the day may be used.



# Blood Tests

- Blood should be collected **aseptically** into a clean tube **without anticoagulants**.
- **Separate the serum** from the blood as soon as possible to avoid hemolysis.



# Blood Tests

- There are two types of pregnancy **blood** tests:
- A **quantitative** blood test measures the **specific level** of hCG in the blood.
- A **qualitative** blood test gives a simple **positive or negative result** to whether pregnant or not (By strips & cassettes).

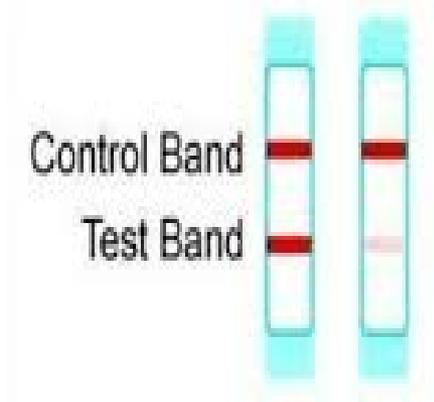
# Pregnancy Test by Strips or Cassette



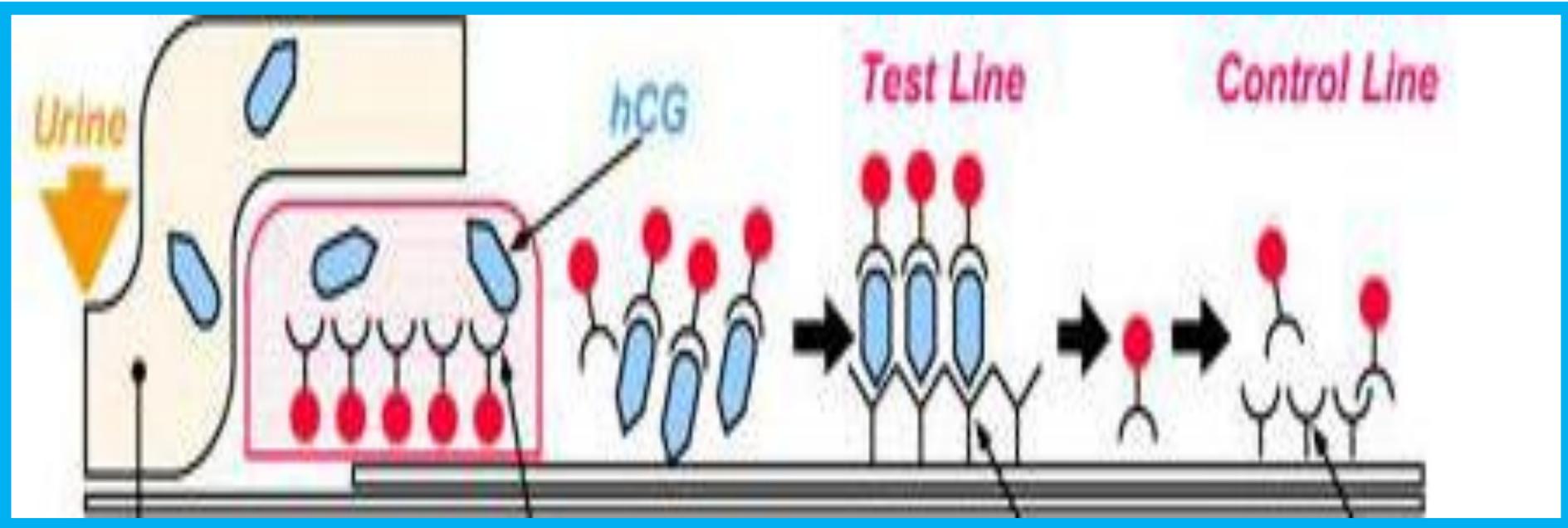
- It is a rapid chromatographic immunoassay for the **qualitative** detection of HCG in **urine or serum**.
- They can be performed at **home** due to ease of use and low cost.
- The **specificity** is **98%** meaning that test is highly selective for hCG.

# Principle

- The test method uses a **membrane** that contains all necessary **antibodies and reagents** to perform the test.
- The principle of the test is based on the **sample migrating** by capillary action **along the membrane** and encountering a **anti-hCG antibody**.
- The test uses **two lines** to indicate results (Test; **T** & Control; **C**)



# Principle



# Principle

- **If the sample contains hCG**, a complex is formed with the anti-hCG antibody, and continues to migrate along the membrane to the **Test (T) line** region, where the complex becomes bound to a “fixed” anti-hCG antibody. The result will be the production of **a colored marker if the level of hCG in the sample is 25 mIU/mL or greater.**
- **Unbound anti-hCG** migrates to the **Control (C) line**, where it binds to a different “fixed” anti-hCG that will produce **a color regardless of the amount of hCG in the sample.**
- Color development at the **Control line indicates that the test system is working properly** (*the test procedure followed properly and the proper amount of urine or serum was absorbed*).

# Procedure

- The test **membrane** may be attached to a supporting strip or contained in a cassette.
- A test sample is introduced to the membrane by briefly **dipping the strip in urine** or urine is applied to **a specific location on the test cassette**.
- Then, observe the formation of colored lines

# Procedure

## Strip

1



2

**10-20 min**

3



Positive



Negative

## Cassette

1



2

**10-20 min**

3



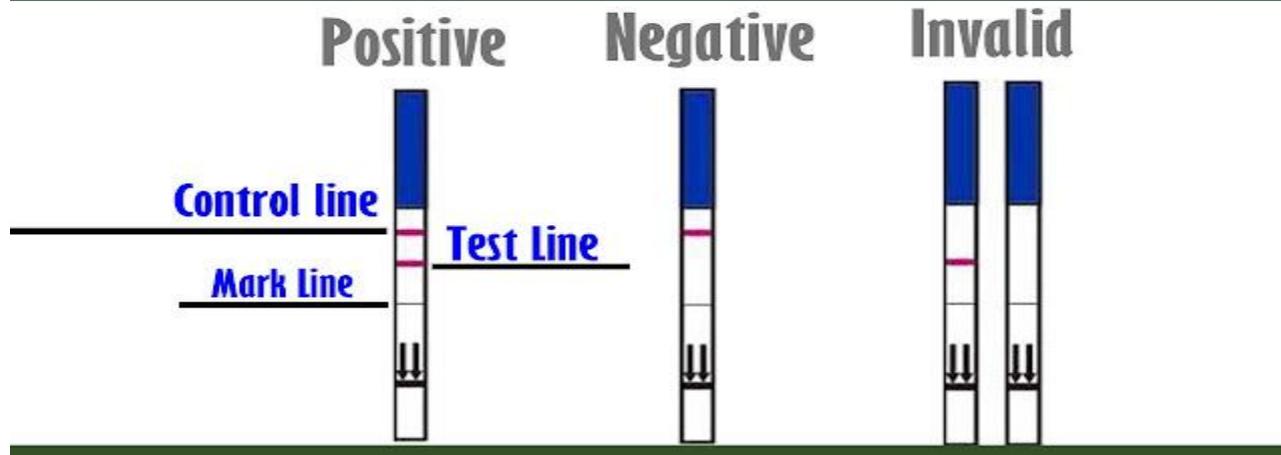
Positive



Negative

# Results Interpretation

## Urine Pregnancy Test Result



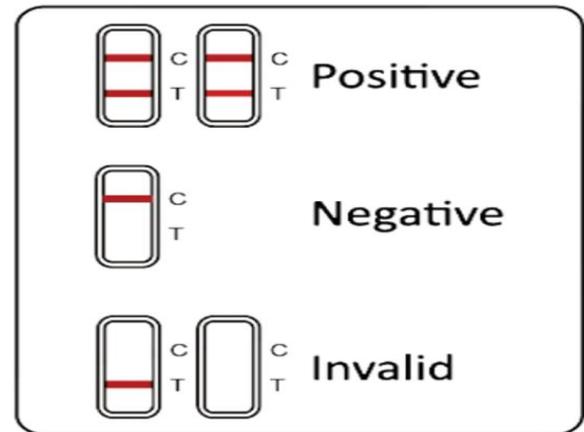
pregnant



Presence of the test line (T) correlates with the detection of hCG, which is the indication for a positive result.

Absence of the test line (T) correlates with low hCG concentration in urine. This is a negative test result.

not pregnant



# False positive results

- Conditions other than pregnancy can cause elevated hCG levels and **positive reactions in hCG tests in the absence of pregnancy** (false positive result).
- These include:
  - **Trophoblastic disease: choriocarcinoma**
  - **Non-trophoblastic disease: breast, ovarian and testicular tumors.**

# Advantages of blood pregnancy test

- Can detect a pregnancy **earlier than a urine test** at about **3-10 days** from possible conception.
- Can **measure the concentration of hCG** hormone in the blood (useful information for tracking certain problems in pregnancy).

# Disadvantages of blood pregnancy test

- More **expensive** than a urine test.
- Takes a **longer time** to get results.
- Must be done in a **clinical laboratory**.



**Thank You**