

The earliest known pregnancy test dates back to 1350 BC in Ancient Egypt. According to the Egyptians, all you have to do is urinate on wheat and barley seeds, and wait. If either sprouts, congratulations, you're pregnant! And if wheat sprouts faster, it's a girl, but if barley, it's a boy. In 1963, a small study reproduced this test and found that it predicted pregnancy with a respectable 70% accuracy, though it couldn't reliably tell the sex of the baby.

Scientists hypothesized that the test worked because pregnant women's urine contains more estrogen, which can promote seed growth. Now it's easy to take this ancient method for granted because modern pregnancy tests give highly accurate results within minutes. So how do they work?

Over-the-counter pregnancy tests are all designed to detect one thing: a hormone called HCG. HCG is produced in the earliest stages of pregnancy and starts a game of telephone that tells the body not to shed the inner lining of the uterus that month. As the pregnancy progresses, HCG supports the formation of the placenta, which transfers nutrients from mother to fetus.

The test starts when urine is applied to the exposed end of the strip. As the fluid travels up the absorbent fibers, it will cross three separate zones, each with an important task. When the wave hits the first zone, the reaction zone, Y-shaped proteins called antibodies will grab onto any HCG. Attached to these antibodies is a handy enzyme with the ability to turn on dye molecules, which will be crucial later down the road. Then the urine picks up all the AB1 enzymes and carries them to the test zone, which is where the results show up. Secured to this zone are more Y-shaped antibodies that will also stick to HCG on one of its five binding sites. Scientists call this type of test a sandwich assay. If HCG is present, it gets sandwiched between the AB1 enzyme and AB2, and sticks to the test zone, allowing the attached dye-activating enzyme to do its job and create a visible pattern. If there's no HCG, the wave of urine and enzymes just passes on by. Finally, there's one last stop to make, the control zone.

As in any good experiment, this step confirms that the test is working properly. Whether the AB1 enzymes never saw HCG, or they're extras because Zone 1 is overstocked with them, all the unbound AB1 enzymes picked up in Zone 1 should end up here and activate more dye. So, if no pattern appears, that indicates that the test was faulty. These tests are pretty reliable, but they're not failproof. For instance, false negatives can occur if concentrations of HCG aren't high enough for detection.

After implantation, HCG levels double every two to three days, so it may just be too early to tell. And beverages can dilute the urine sample, which is why doctors recommend taking the test first thing in the morning. On the other hand, false positives can come from other sources of HCG, like IVF injections, ectopic pregnancies, or certain cancers such as uterine cancer or testicular cancer, making it possible for one of these tests to tell a man he's pregnant.

The best way for a woman to find out for sure is at the doctor's office. The doctors are also looking for HCG, but with tests that are more sensitive and quantitative, which means they can determine the exact level of HCG in your blood. A few minutes can feel like forever when you're waiting on the results of a pregnancy test. But in that brief time, you're witnessing the power of the scientific method. That one little stick lets you ask a question, perform a controlled experiment, and then analyze the results to check your original hypothesis. And the best part is you won't even have to wait until the next harvest.

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