Test principle

Besurence Ovulation is a rapid one-step test, based on an immunochromatographic technology. A membrane with an absorbent pad overlies the strip of fibers glass paper that is impregnated with a lyophilized colloidal conjugate of gold particles and monoclonal solid phase antibodies to LH. Other absorbent pads at the end of the assay absorb excess sample fluid. The urine sample is introduced into the device and proceeds through the absorbent pad, then laterally onto a chromatographic membrane. As it contacts the membrane, the sample dissolves the lyophilized conjugate. In a reactive sample, the LH antigen will attach to the antibodies in the colloidal solution. As the conjugate moves forward on the membrane, anti-LH monoclonal antibody affixed on the test zone (“T”) will bind the LH-gold conjugate complex, forming a pink line (“T”). All samples will cause a pink-colored line to appear in the control zone (“C”). This line is formed by the binding of the polyclonal antibodies (anti- mouse IgG) affixed onto the control zone to the sample-colloidal gold conjugate. Presence of this line indicates that the test has been carried out correctly.

When to begin testing

First, determine the length of your menstrual cycle. This is the number of days from the first day of your menstrual bleeding to the day before your next bleeding begins again. Please refer to the chart to determine when you should start testing. If your cycle is shorter than 21 days or longer than 38 days, consult your doctor. If you do not know your cycle length, you may begin the test 11 days after your first period since the average cycle length is 28 days.

It is recommended that you use Besurence Ovulation twice a day in the morning (after 10 am) and in the evening to more effectively and accurately catch your ovulation timing. Use a new test stick for every time you want to perform a test.

Materials provided

- Each pouch contains:
  1. One (1) test stick.
  2. Desiccant (do not eat)
- Each box of Besurence Ovulation contains
  1. Five (5) foil pouches
  2. One (1) instructions for use
- Other equipment or reagents needed
  1. Timer
  2. A clean cup for every test run

Storage and stability

Besurence Ovulation can be stored at temperature (4 °C to 30 °C) in the sealed pouch to the date of expiration. The test kits should be kept away from direct sunlight, moisture and heat.

Assay procedure

- Specimen collection and handling
  1. Urine specimen must be collected in a clean and dry cup.
  2. Collect urine at about the same time each day. For best results, test between 10am–8pm.
  3. Reduce liquid intake about 2 hours before collecting your urine as a diluted urine sample may cause false negative result.
  4. Urine specimens exhibiting visible precipitates should be set aside to obtain a clear specimen for testing.
- Test procedure
  1. Bring the test pouch and urine to room temperature.
  2. To begin testing, open the sealed pouch by tearing along the notch. Remove the test from the pouch and use it as soon as once opened.
  3. Hold the handle of the test with one hand. Use the other hand to remove the cap and expose the absorbent. Put the cap aside for re-cap later. (See the picture).

Warning: for in vitro diagnostic use only

1. Read directions for use carefully before performing this test. Pay attention to the position of the C and T line.
2. Do not use beyond the labeled expiration date.
3. Do not reuse the test devices. Discard it in the dustbin after single use.
4. Do not use if the pouch is damaged or opened.
5. Do not touch the membrane on the strip.
6. Once you open the pouch, the test device should be used immediately. Prolonged exposure to ambient humidity will cause product deterioration.
7. Treat urine samples and used devices as if they are potentially infectious. Avoid contact with skin.
8. In case you want to use the test by dipping it into your urine sample, please make sure if you have a clean urine cup available before using the test.

Intended Use

Besurence Ovulation is a self-performing immunochromatographic one-step assay designed for in vitro qualitative determination of human Luteinizing hormone (LH) in urine to predict when there is LH surge, and in turn, when you are likely to ovulate. Besurence Ovulation is designed for both professional and lay users.

Summary and explanation

Human Luteinizing hormone (LH) is a glycoprotein hormone secreted by the anterior pituitary. This hormone is composed of α and β subunits. The amino acid sequence of α-LH is essentially identical to that of other hormones including follicle stimulating hormone (FSH), thyroid stimulating hormone (TSH) and human Chorionic Gonadotropin (HCG). It is the β subunit of LH that confers the biological and immunochemical specificity of the hormone (1). LH and FSH together with other steroid hormones are known to play important roles in regulating the ovulation and ovarian functions during the menstrual cycle. Maturation of an ovarian follicle and peaking of LH activity at the mid-cycle (LH surge).

Each pouch contains:

1. One (1) test stick.
2. One (1) instructions for use
3. Five (5) foil pouches
4. Cap Sample well Result window Handle

3. Point the absorbent tip downward; place the absorbent tip in urine stream for at least 10 seconds to be thoroughly wet.

Otherwise, you can also collect your urine in a clean cup (not provided) and dip half of the absorbent pad into the urine for at least 10 seconds.
4. Re-cap the device and wait for colored bands to appear. Read the result at 10 minutes.
5. Discard the test device after single use in the dustbin.
6. Do not read test result after 20 minutes.
Interpretation of results

- **Positive**: If two color bands are visible and the test band is equal in color intensity or darker as compared to the control band. It is considered positive and you will probably ovulate within the next 24–48 hours.

- **Negative**: Only one color band appears on the control region or the test band is lighter in color intensity as compared to the control band. There is no LH surge.

- **Invalid**: No visible bands at all or only one red reactive band appears on the test region. It is indicated the test failed or the strip invalid, which is recommended in this case that the test should be repeated.

Quality control

- **Built in Quality Control Features**: When the test is complete, you will see a pink-purple colored band in the “C” area of the test window on negative samples and a pink-purple colored band in the “T” and “C” area on positive samples. The appearance of the CONTROL band indicates that the test is performing properly and serves as a procedural control.

Performance characteristics

- **Sensitivity**: Besurence Ovulation will display positive results with specimens containing LH at a level greater than 25 mIU/mL. When urine LH level is less than 25 mIU/mL but greater than 10 mIU/mL, the test line will show a faint color which is lighter than the control line in its intensity.

- **Specificity**: The specificity of Besurence Ovulation was determined from cross reaction studies with known amounts of Follicle Stimulating Hormone (FSH), thyroid Stimulating Hormone (TSH) and Chorionic Gonadotropin (HCG). Samples containing 25 mIU/mL HCG, 200 mIU/mL FSH and 250 µIU/mL TSH yielded negative results.

- **Diagnostic Sensitivity and Specificity**: A total of 48 female and 60 menstrual cycles were followed and monitored with Besurence Ovulation. LH urine surge was detected in 47/60 cycles which was confirmed by other clinical diagnostics methods including endometrial biopsy.

Clinical Accuracy of Besurence Ovulation

<table>
<thead>
<tr>
<th>Urine test result/ Other Clinical test result</th>
<th>Clinical Test Positive</th>
<th>Clinical Test Negative</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urine test positive</td>
<td>47</td>
<td>0</td>
<td>47</td>
</tr>
<tr>
<td>Urine test negative</td>
<td>0</td>
<td>13</td>
<td>13</td>
</tr>
<tr>
<td>Total</td>
<td>47</td>
<td>13</td>
<td>60</td>
</tr>
</tbody>
</table>

Diagnostic Sensitivity (Positive agreement): 47/47*100% = 100%

Diagnostic Specificity (Negative agreement): 13/13*100% = 100%

Comparison studies on Besurence Ovulation with a legally marketed device performed in-house and in a clinical reference laboratory. Positive and negative results were compared and the correlation was greater than 97%.

- **Non-cross reacting compounds**
  - Acetaminophen: 20 mg/dl
  - Acetosal: 20 mg/dl
  - Salicylic Acid: 20 mg/dl
  - Ascorbic Acid: 20 mg/dl
  - Caffeine: 20 mg/dl
  - Gentisic: 20 mg/dl
  - Ampicillin: 20 mg/dl
  - Tetracycline: 20 mg/dl
  - Hemoglobin: 1 mg/dl
  - Albumin: 1000 mg/dl
  - Glucose: 2 g/dl

- **Repeatability and Reproducibility**: Three lots of Besurence Ovulation were used and 10 strips of each lot were tested in LH standard solution with different concentrations prepared at 0 mIU/mL, 25 mIU/mL and 100 mIU/mL.

<table>
<thead>
<tr>
<th>LH concentration</th>
<th>20030401</th>
<th>20030501</th>
<th>20030601</th>
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</thead>
<tbody>
<tr>
<td>0 mIU/mL</td>
<td>P 0 0 0</td>
<td>P 0 0 0</td>
<td>P 0 0 0</td>
</tr>
<tr>
<td>25 mIU/mL</td>
<td>0 10 0 1 0 1 0 0 0</td>
<td>0 10 0 1 0 1 0 0 0</td>
<td>0 10 0 1 0 1 0 0 0</td>
</tr>
<tr>
<td>100 mIU/mL</td>
<td>10 0 10 0 10 0 10 0 0</td>
<td>0 10 0 10 0 10 0 0 0</td>
<td></td>
</tr>
</tbody>
</table>

P: Positive  N: Negative

All samples were positive at and beyond the cut-off level. No different results were observed.

Limitation of the procedure

- Keep strictly to the instructions provided in order to get reliable test results.
- Compare the color of the test band to that of the control band of the same device on the day the test is performed. Do not compare bands from different devices.
- Do not read the test result after 20 minutes.
- The results of this test cannot be used as an aid for contraception.
- The test should not be used in the following conditions:
  a) During or shortly after pregnancy
  b) During /after the onset of menopause
  c) After or during hormone treatment
- Avoid excess liquid intake during testing since it may dilute the amount of LH in the urine cause inaccurate result.
- Some diseases (e.g. polycystic ovaries, hormonal imbalance) can falsify the results of the test. In this case, a physician should be consulted.
- As it is true with any diagnostic procedure, the user should evaluate data obtained by the use of this kit in light of other clinical information and consult the physicians for the final diagnosis before making any decision of medical relevance.

References