



## The Skinny

Ovarian reserve refers to the quantity or quality of a woman's eggs.

Assessing ovarian reserve is an essential part of the fertility evaluation or in the workup of recurrent pregnancy loss.

For most clinicians, a cycle day 3 (CD3) FSH  $\leq 10$  mIU/ml is reassuring that ovarian reserve is normal.

However, there are many times when a solitary FSH can be misleading. In fact, there are women who have severely diminished ovarian reserve and may have a CD3 FSH less than 10.

The single best way to protect against a falsely-reassuring CD3 FSH is to measure an Estradiol (E2) at the same time.

An elevated Estradiol will tell you that your FSH is being suppressed. In this situation, you really can't trust a normal FSH value. *In fact, an elevated estrogen on CD3 has the same prognostic value as an elevated CD3 FSH.*

If the estrogen is less than 75 pg/ml and the FSH is less than 10 mIU/ml, then this is "normal".

In our clinic, if FSH is  $>10$  mIU/ml, or if estradiol is  $>75$  mIU/ml, then the woman has evidence of diminished ovarian reserve. The fertility window may be closing and more aggressive treatment may be warranted.

It should be stressed that FSH levels which are close to 10 are not as reassuring as those well within the normal range. In fact, the higher the FSH, the lower the pregnancy rate with in vitro fertilization.

### Summary:

Day 3 Labs should include FSH and Estradiol.

Normal FSH  $\leq 10$  mIU/ml

Normal E2  $\leq 75$  pg/ml



**What’s Behind the Skinny**

To understand why a solitary FSH can be misleading, it’s important to remember two facts of physiology: 1) What regulates FSH: Estrogens and Inhibins, and 2) How eggs are recruited.

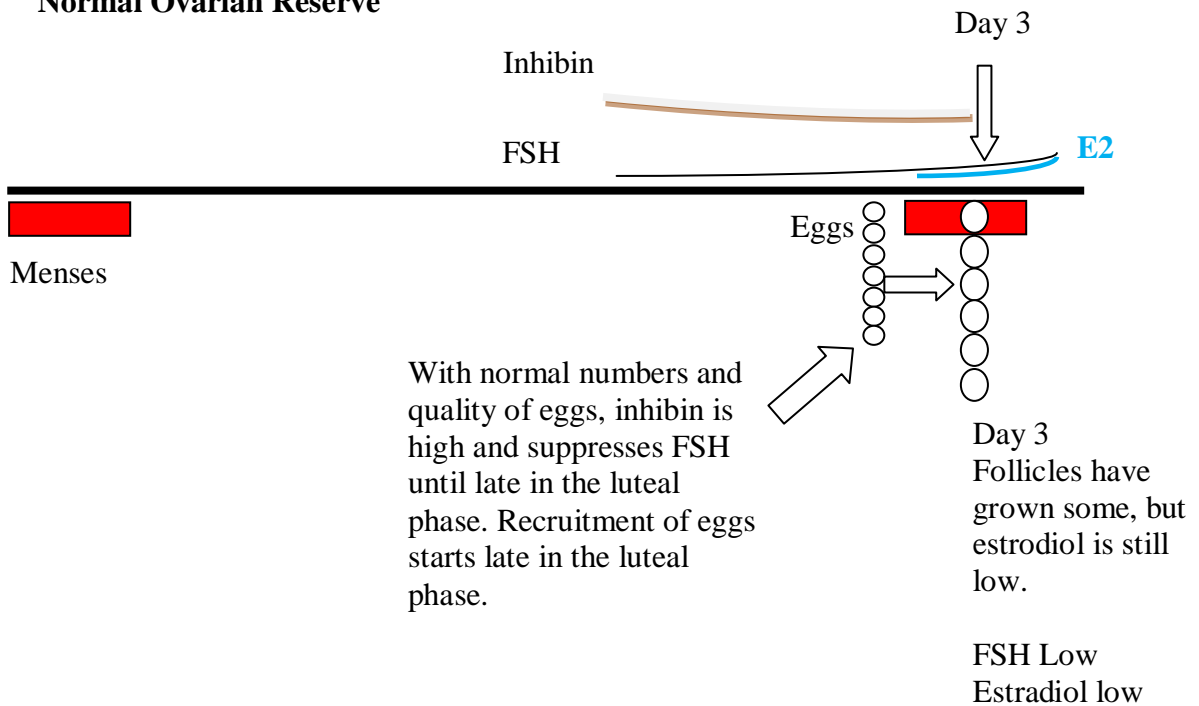
Inhibin is a hormone secreted by the small developing follicles. The more follicles a woman has, the more inhibin she has. Inhibin suppresses FSH secretion. A woman who does not have many antral follicles at the beginning of her menses usually does not produce much inhibin and frequently her FSH will be high. However, even these women can have normal FSH levels.

How can this occur?

The answer is: early follicular recruitment and elevated estradiol levels.

With normal ovarian reserve: late in the luteal phase, shortly before menses, small antral follicles are being recruited by a subtle rise in FSH. When a woman has normal ovarian reserve, the number of follicles being recruited secrete enough inhibin to keep FSH at low levels *both before menses and after menses*. This way, on CD3, she will have a low FSH. Because follicle recruitment began shortly before menses, her estradiol is also still low.

**Normal Ovarian Reserve**



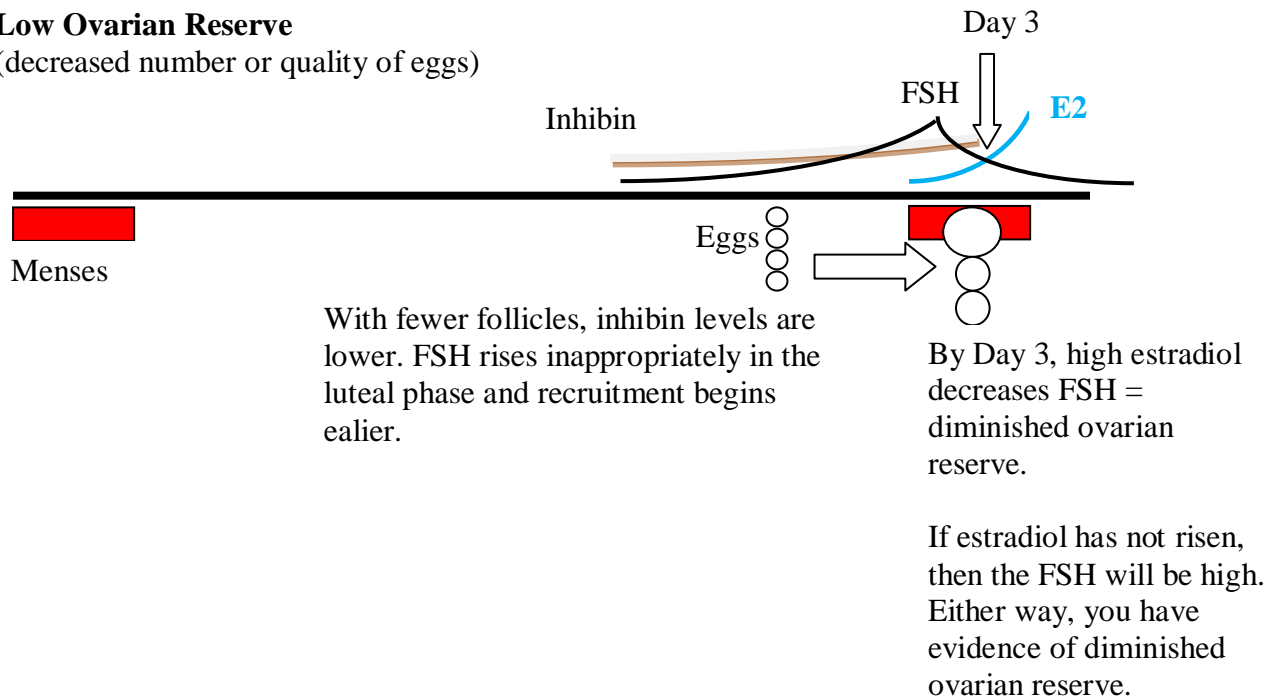
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With diminished ovarian reserve: a woman does not have as many developing follicles. Inhibin levels are lower. With low inhibin levels, FSH is inappropriately high in the luteal phase. With elevated FSH in the luteal phase, follicles start getting recruited earlier. By Day 3, the lead follicles are advanced in size and are secreting higher estrogen levels. These high estrogen levels now suppress FSH back into the normal range.

## Low Ovarian Reserve

(decreased number or quality of eggs)



We call this advanced follicular recruitment. It's not accelerated, it just started earlier in the luteal phase. This is why women's follicular phases frequently get shorter in the latter reproductive years.

### A word about home FSH monitoring:

This concept also demonstrates why tests which allow for women to measure FSH at home with a urine test cannot be relied upon. The urine test only measures FSH and does not measure estradiol, so you can't trust a normal result. The urine test is only helpful if it's abnormal. A normal urine test is not reassuring.