

Could Leptin be the next fertility medication?

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Leptin is a hormone produced in adipose tissue (fat cells). It has been the subject of much study in recent years. Leptin was first discovered in 1994. It is primarily thought of as an appetite and weight regulation hormone. However, leptin also functions to signal the brain and other organs about dangerous states of very low energy availability. Leptin is secreted into the bloodstream in proportion to the amount of energy stored in fat. The leptin is detected by receptors in the brain where it signals how much energy is available. It thereby regulates several key physiological functions that depend on adequate energy balance, including reproduction, metabolism, and bone formation.

We have known for some time that women who have very low body fat and/or those who exercise vigorously can stop ovulating. Once they stop ovulating, they no longer produce essential hormones like estrogen and their periods can also stop or become infrequent. This condition is called functional hypothalamic amenorrhea or anovulation (FHA). FHA results in infertility due to the failure of ovulation. Another important health issue for these women is osteoporosis (bone thinning which increases the risk for fracture)

Traditionally, in order to achieve pregnancy in these women, we used one of several techniques. First, we might ask the woman to decrease or stop her exercise or try to gain weight. This is usually successful in getting ovulation to return. there is a relationship between the length of time a woman has had FHA and the length of time it takes ovulation and fertility to return after she reduces or stops her exercise regimen. For example, if a woman start training for a marathon and her periods stop for a few months, generally it might take a few months after she stops training for her ovulation and periods to resume. However, if a woman has been thin and a "recreational" athlete her whole life, it might take a longer time for her ovulation to return. Finally, some women are reluctant to try this approach. For these women, we would use fertility medications to induce ovulation. This is effective but requires monitoring and has a risk for multiple pregnancy.

In 2005, researchers in Boston studied 14 female athletes who had stopped menstruating on average five-and-a-half years before the start of the study. They had about 40-percent less body fat than the average woman. Eight of the women received leptin, while the others served as controls. After just three months of treatment, women receiving twice-daily leptin supplements resumed menstrual periods, and their ovaries began to function normally. The hormone also significantly improved bone density bone markers in the blood. No change was observed in the control group.

This is pretty exciting stuff. If these results can be confirmed in larger studies and if a pharmaceutical company is willing to put forth the financial risk to do the additional dosing and safety studies, then leptin could become a viable treatment option for this group of patients.

Could leptin be used to treat other ovulation problems like polycystic ovary syndrome - PCOS? This is less certain. Many studies have been conducted trying to determine whether leptin levels are correlated with polycystic ovary syndrome - PCOS but with inconsistent results. Theoretically, however, polycystic ovary syndrome - PCOS patients may have too much leptin and need a medication which blocks or reduces its effects.

