

Body Composition and Hormone Therapy - Truth and Tales

Making Sense of the Hormonal Madness

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One of the hottest topics in the menopausal health space is the **role of hormone therapy (HT) in body composition and muscle function.**

The cornerstone of the **menopausal transition** is the **decline in ovarian function leading to a reduction in ovarian estrogen production,** which leads to many of the physiological changes and symptoms associated with this life

transition. The thought is if we can add back what is “missing”, then everything will be fine! Well, it’s more complicated than that!

Where many practitioners focus on “hormone levels”, here we focus on the often less-talked-about elements of the hormonal equation - **the hormone receptor and tissue response to hormones.**

A Quick Hormone Tutorial

- **Hormones are chemical “signals”** secreted by various glands in the body that communicate with other tissues to carry out a specific function.
- Every hormone **“signal”** needs an **“antenna”** to **respond to the signal** and convey the hormonal message to the cell. These “antennae” are called **receptors**, which are proteins that reside on the **surface of cells/tissues throughout the body.**
- The endocrine system represents a **“conversation” between cells and tissues** where the **hormone signal is the “voice”** and the recipient tissue **receptors are the “ears”** that hear and translate the hormone signal.

Hormones and receptors are inseparable in carrying out their functions. If there are no receptors, the hormone signal isn’t heard. Likewise, if there is no hormone, there is no signal for the receptors to hear.

The decline in ovarian estrogen production during **the peri-menopausal transition is accompanied by a reduction/change in the number of estrogen receptors on the surface of**

the cells of various tissues. There are many types of estrogen receptors throughout the body, but one that has gained much attention is **estrogen receptor alpha (ER-alpha).**

ER-alpha plays a key role in **muscle, adipose (fat) tissue, liver, and mitochondrial function** (mitochondria are the “batteries” inside of cells that generate the “power” so the cell can function).

We know from animal studies that when **ER-alpha is missing** from these tissues, we see **increased adiposity, glucose intolerance and insulin resistance, and dysfunctional cellular metabolism.** This tells us that estrogen and the ER-alpha receptor play key roles in these processes.

During the **menopausal transition,** women begin to experience a change in body composition, increase in fat accumulation, reduction in muscle mass and strength, and insulin resistance along with many other physical and psychological changes. Although changes in the hormonal pathways involved in the peri-menopausal transition are complex, there is **evidence that the estrogen/ER-alpha pathway plays a key role in why these physiological changes are occurring.**

The burning question then becomes whether (HT) can prevent or “fix” the changes accompanying the menopausal transition. The answer is not so clear because circulating hormone levels are only half the story. HT can indeed increase estrogen levels in the bloodstream and provide relief for many symptoms, however, the change in tissue responsiveness to estrogen due to fewer/changing estrogen receptors is the other half of the hormonal equation.

Clinically, we see evidence of this with more studies surfacing that show that achieving pre-menopausal physiologic hormone levels with HT does not, in and of itself, appreciably change body composition and in some cases, make it more difficult to lose fat accumulation.

Further, **ER-alpha receptors will continue to decline with time beyond menopause even in the presence of adequate HT.** This may be the reason why we see a clear **“window” of the benefit of HT** for some menopausal symptoms during the first 10 years of menopause onset. But beyond the 10-year mark, these favorable effects wane and HT may even be associated with increased health risks.

So what is HT good for? Lots of things! It is very effective for treating **vasomotor symptoms** (hot flashes) and **preventing osteoporosis.** It is extremely important for **young, prematurely menopausal women to prevent bone loss, cardiovascular disease, cognitive decline, and sexual function.** Vaginal HT helps with the **genitourinary symptoms of menopause** and can help improve pain with sexual intercourse due to thinning of the vaginal tissue.

In these cases, **HT is treating symptoms and prevents some forms of chronic disease - but it is not restoring the body to the pre-menopausal state.** This is a very important distinction and is likely why HT works for some things and not others.

But what about testosterone (T) therapy? There is good evidence that T is very **effective in treating hypoactive sexual desire disorder in postmenopausal women**, however, achieving pre-menopausal levels of testosterone with T therapy may not be adequate to see significant differences in body composition according to a randomized trial by Huang et al. In this study, **only testosterone levels that exceeded the female physiologic range resulted in significant changes in lean body mass**. These results underscore the notion that muscle tissue is less responsive to physiologic testosterone levels in menopausal women as compared to reproductive-age women.

So if HT alone is not an effective path for maintaining healthy body composition, how do we manage these changes? Simply put, and supported by research, **nutrition management and physical exercise** that includes HIIT training, plyometrics and heavy resistance training are the **most effective interventions for optimizing body composition, muscle function, and cardiovascular health**. These interventions **mitigate the effects of the changing hormonal environment** during the menopausal transition by targeting pathways that are not as dependent on reproductive hormones. Think of **fitness and nutrition as the “end run” around changing hormones**.

The estrogen / ER-alpha pathway is just one of the thousands of hormonal and metabolic pathways that are active and changing during the menopause transition. However, this particular pathway may be a model for how other hormonal pathways work which can help scientists and medical practitioners gain a greater understanding of the biology at play and what therapies and interventions will be of greatest benefit.

References

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