

## Effects of Androgen on Female individuals

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**Abstract:** Objective: To investigate the effect of androgen on female individuals. Methods: In the physiological, pathological and pharmacological conditions, we summarize the role of androgen in female individuals, analyze its current research situation, and speculate the possible research direction. Results: It was found that androgen has important effects on the physiology, pathology and pharmacology of female. Conclusion: Androgen plays an important role in maintaining the normal physiological activities of female individuals; In the pathological state of the female, index of the androgen also changed, and further affected the condition of the disease; The drug with the function of androgen has a certain effect on the female, and it also has a certain effect on the treatment of female specific diseases, In the future such drug can be developed, and they can treat the disease of women.

Androgen is a steroid hormone, and its main form is testosterone (T) under the natural state, but only free testosterone has biological activity. In the female body, androgen is in a dynamic equilibrium state. The appropriate androgen secretion plays a very important role in the physiology and behavior of women.

### Effects of Androgen on Female Individuals Under Physiological Conditions

After puberty, the ovary can produce a certain amount of androgen with the development of the follicle. After menopause, sulfate DHEA in adrenal gland converted to androgen and estrogen in peripheral tissues. The effects of androgen on the female under physiological conditions are as follows:

The male hormone at normal levels, can help women to keep good mood, and T concentrations of all kinds of abnormal conditions are likely to affect the mood. When the level of T is high in the womb of women, which will cause male style of behavior and ability [1].

Androgen has a regulatory effect on bone growth and development, peak bone mass and bone mass. During puberty, androgen stimulation muscle and bone growth, accelerate the fusion of the epiphyseal cartilage. T and E2 have anti bone resorption effect in postmenopausal women, and it is easy to cause osteoporosis [2].

The right amount of androgen in the female body has an important role in regulating follicle development and ovulation, through the regulation of different stages of granulosa cells and follicular cells, and then regulate the development and atresia of follicles. In the early stage of small sinus follicle development, it can increase the recruitment of follicles, play a certain role in the initiation and early development of follicles [3]. In addition, the high level of T can lead to infertility.

In addition, androgen to female cognition [4], material metabolism and sexual desire also has a great impact [5].

## **The Effect of Androgen on the Female Under Pathological Conditions**

### **Breast Cancer, Ovarian Cancer, Endometrial Cancer**

The content of testosterone in the tumor tissues of postmenopausal women with breast cancer was significantly higher than that in the postmenopausal women with breast cancer, which has a more important role in the development of breast cancer in postmenopausal women. It is speculated that the effect of AR on breast cancer cells may be related to the different hormone receptor status [6].

Ovarian cancer is a sex hormone sensitive tumor. Serum androgen levels increased, the risk of cancer increased [7].

### **Polycystic Ovarian Tumor (PCOS)**

Under the combined action of the ovary and adrenal gland, the female has a lot of androgen when it is suffering from PCOS. LH continuous stimulation can affect the estrogen synthesis, thus the androgen more dominant. Further studies also showed that SHBG LH continuous stimulation can affect the estrogen synthesis, thus the androgen more dominant. Further studies also showed that SHBG gene may be combined with the androgen receptor gene, to jointly promote the individual's PCOS phenotype [8].

### **Coronary Heart Disease in Postmenopausal Women**

In postmenopausal women with coronary heart disease, the proportion of estradiol and testosterone decreased, and it was closely related to the adverse blood lipid. With the development of the research, scholars believe that androgen retard atherosclerosis of postmenopausal women, improve coronary heart disease and ischemic cerebral infarction prognosis [9].

### **Other Effects**

After puberty, acne is elevated in male hormones, high androgen levels and the secretion of sebum can aggravate acne [10].

## **Effect of Androgen on The Female under Pharmacological Activity**

Under pharmacological doses, the main effect of androgen on the female role is in regulating the immune system, reproductive system, nervous system, bone tissue protection and anti-aging.

### **Reproductive System and Nervous System**

Androgen is not only the substrate of estrogen synthesis, but also regulates the synthesis of granule cells and the function of granule cells. Animal experiments showed that DHEA with androgen effect of drugs can improve the clinical pregnancy rate, also can treat patients with premature ovarian failure. In the treatment of infertile women with ovarian reserve function, the appropriate amount of male hormone is beneficial to the development of oocytes [12]. DHEA therapy can reduce the rate of abortion in all ages, especially in women over the age of 35.

Cistanche with androgen like effect, increased brain homogenate in 5-HT and DA levels, fight Female depression [13]. DHEA can promote neurite growth and neural stem cell proliferation [14].

### **Protection of Bone Tissue and Anti aging**

Cordyceps can regulate cytoskeletal reorganization, enhance osteoblast differentiation [15]. DHEA as the only source of sex hormones in postmenopausal women, DHEA

levels and bone density were positively correlated, DHEA can improve bone density by increasing bone density [16].

The potential application value of DHEA in the treatment of peri menopausal and postmenopausal women has been paid attention to, even called "anti aging hormone" [17-18].

### **Breast cancer, Uterine Fibroids**

The inhibitory effect of androgens on breast cancer cells is not only by a drop in levels and the role of estrogen, studies have shown that androgen can through the androgen receptor (AR) direct inhibition of tumor growth, especially has certain curative effect for patients with advanced breast cancer, have protective effects against breast cancer [19]. DHEA can treat cardiovascular disease, improve the activity of large and small vascular endothelial cells, reduce total cholesterol, but does not affect blood pressure, can also be treated for uterine fibroids.

### **Other Effects**

Modern studies have indicated that androgen can stimulate the bone marrow hematopoietic function [20], treat diabetes, and regulate the immune system [11] in the female body.

But the female long-term, a large number of use of androgen, there is an increase in hair, voice thicker, acne and other male performance, there is a certain damage to the liver.

### **Outlook**

The appropriate amount of androgen secreted by the female body plays an important role in the physiology state. In the pathological state, androgen is also associated with common gynecological diseases. Use of drugs related to androgen or have the role of androgen, can be used for Treatment of gynecological diseases.

Our laboratory has long and a large number of studies found that medication of male division can treat common gynecological diseases, and put forward the theory of "anti regulation and balance" [21]. The proposed "female disease male governance", provide a new perspective for The etiology and pathology of female diseases. This viewpoint expand range of drugs for treatment of gynecological diseases, and also provide new ideas for the treatment of common gynecological diseases.

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