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Relationship between Homeostasis of Ovarian and Systemic Immune Cells in Patients with Polycystic Ovary Syndrome and Autophagy Levels during Pregnancy

Yingjie Tang[1,a] and Yingzheng Pan[2,b,*]

[1]Department of Obstetrics, Chongqing Health Center for Women and Children, Chongqing 401147, Chongqing, China
[2]Department of Gynecological Endocrinology, Chongqing Health Center for Women and Children, Chongqing 401147, Chongqing, China
[a]xiaobai119@gmail.com, [b]panyingzheng01@163.com
**corresponding author*

Abstract: *Polycystic Ovary Syndrome (PCOS) is a very common disease in gynecological endocrine clinics. Its clinical manifestations are heterogeneous, which seriously affects the quality of life of women. Therefore, this article proposes a study on the relationship between ovarian and systemic immune cell homeostasis and autophagy levels in patients with polycystic ovary syndrome during pregnancy, aiming to explore the relationship between cell homeostasis and autophagy in PCOS patients, and help patients get rid of them as soon as possible disease. This article mainly adopts various methods such as literature data method and experimental analysis method to gain an in-depth understanding of the clinical manifestations, pathological characteristics and related treatment research of PCOS, as well as auxiliary diagnosis methods under intelligent medical treatment. On the basis of the above theories, design Experiments related to the imbalance of cell homeostasis and autophagy level in PCOS patients. Through the serum test and glucose tolerance test of the patients, and the use of homeostasis model for evaluation, the biochemical characteristics, insulin resistance index, protein expression level and other related factors of the patients were analyzed. The protein expression of follicular granule cells in the PCOS group was higher than that in the control group ($P<0.05$), which was statistically different.*

Keywords: *Polycystic Ovary Syndrome, Ovarian Pregnancy, Systemic Immunity, Cell Homeostasis, Autophagy Level*

1. Introduction

With the development of the times, artificial intelligence and science and technology have been advancing, and intelligent diagnosis methods have also been continuously penetrated into the lives of the people. In the medical field, medical data continues to grow, medical equipment and auxiliary systems are constantly updated, and the research of intelligent medical treatment is also attracting more and more attention from scholars.

In recent years, more and more young women suffer from polycystic ovary syndrome (PCOS), which has become a disease of common concern for multidisciplinary physicians and requires long-term prevention and treatment. PCOS can cause ovulation disorders, obesity and even secondary amenorrhoea in women. More and more evidences show that it can affect women's life, not only menstrual and fertility problems, but also the reproductive function of patients, and increase the incidence of estrogen-dependent tumors such as endometrial cancer. Related metabolic disorders include hyperandrogenemia, insulin resistance, abnormal glucose metabolism, abnormal lipid metabolism, and the risk of insulin resistance to cardiovascular disease. Therefore, the study of systemic immune cells is imminent.

Wu X K In some patients with polycystic ovary syndrome, acupuncture is used to induce ovulation, but there is no clinical evidence to support it. To evaluate whether active acupuncture alone or in combination with clomiphene citrate increases the possibility of live birth in women with polycystic

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ovary syndrome. From July 6, 2012 to November 18, 2014, a double-blind (clomiphene vs placebo), single-blind (active acupuncture vs. controlled acupuncture) factorial analysis was performed in 21 locations (27 hospitals) in Mainland China the trial was followed up for 10 months to October 7, 2015. Chinese patients with polycystic ovary syndrome were randomly divided into 4 groups at a ratio of 1:1:1:1. Active or controlled acupuncture twice a week, 30 minutes each time, clomiphene or placebo for 5 days each cycle, up to 4 cycles. The active acupuncture group used deep needle insertion and low-frequency electrical stimulation. The control needle group used shallow needle insertion, no stimulation, and simulated electrical stimulation. However, he did not give a reasonable explanation for the results of the experiment [1]. Yin Z macroautophagy/autophagy is an evolutionarily conserved cell degradation process that targets cytoplasmic substances, including cytoplasm, macromolecules and unwanted organelles. The discovery and analysis of autophagy-related proteins revealed many mechanisms of autophagosome formation. Recent studies have revealed its significance in cell and body homeostasis. Autophagy dysfunction and imbalance are related to various diseases. He reviewed the physiological role, molecular mechanism, regulatory network, and pathophysiological role of autophagy. However, his experiment did not explain the specific effects of autophagy and cell homeostasis, development and immunity [2]. Pedros C In the intestine, there are billions of non-self antigens from food and microbiota. The immune response must be strictly regulated to ensure the host's protection against pathogenic microorganisms and the absence of immune-related diseases. Regulatory T cells (Tregs) play a key role in this regard. In fact, Tregs can prevent excessive inflammation, which may lead to the destruction of intestinal homeostasis observed in inflammatory bowel diseases (IBDs). Throughout the second half of the 20th century, the global incidence and prevalence of such diseases have increased. Therefore, understanding how Tregs inhibit coliform-derived immune cells is of great significance for the treatment of patients with IBDs. In this review, they will first summarize the results obtained in animal model studies. These results emphasize the importance of Tregs in maintaining intestinal homeostasis and describe the specific inhibitory mechanisms involved. However, he did not continue to research, and how Tregs have an effect on human IBDs has not been fully described [3].

The innovations of this article are: (1) The combination of qualitative research and quantitative research, and adequate analysis of research data; (2) The combination of theoretical research and empirical research, based on the theory of intelligent medical auxiliary diagnosis methods, combined Empirical research on the situation of patients with polycystic ovary syndrome.

2. Research Methods of Ovarian and Systemic Immune Cell Homeostasis and Autophagy Levels in Patients with Polycystic Ovary Syndrome during Pregnancy

2.1 Polycystic Ovary Syndrome

(1) Overview of polycystic ovary syndrome

Polycystic ovarian syndrome (PCOS) is a common clinical disease in gynecological endocrinology. Its clinical symptoms are diverse, not only affecting menstruation and reproductive ability, but also affecting the patient's reproductive function [4], affecting endometrial cancer and other estrogen-dependent tumors. Increasing prevalence and associated metabolic disorders, including high cholesterol, insulin resistance, abnormal glucose metabolism, abnormal metabolic lipids, and increased risk of cardiovascular disease [5]. Its clinical symptoms extend beyond the field of gynecological endocrinology. From the young age, the various symptoms of polycystic ovarian syndrome continue after women's amenorrhea, which has a serious impact on women's quality of life, and has caused a great social and economic burden.

(2) Clinical manifestations of polycystic ovary syndrome

Polycystic ovarian syndrome is a reproductive and endocrine metabolic disorder caused by reproductive dysfunction and abnormal endocrine metabolism. Its clinical features are increased male hormones, persistent ovarian disorders, and changes in polycystic ovaries [6]. In epidemiological studies, women with polycystic ovarian syndrome of reproductive age account for about 6% to 10%, and 20% of the infertile population [7-8].

(3) Pathological features of polycystic ovary syndrome

More and more studies have confirmed that PCOS is not only limited to reproductive dysfunction, but also an endocrine disease of sugar and fat metabolism disorders [9]. A large number of studies have proved that insulin resistance (IR) and hyperinsulinemia (HI) may play an early role in the onset of

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PCOS, which is an important biochemical characteristic and pathophysiological basis of PCOS, and the degree of insulin resistance is higher in obese patients with PCOS than in non-obese patients [10-11]. Many studies have also found that PCOS patients are more likely to develop hypertension, hyperlipidemia, diabetes and other metabolic diseases than ordinary women, and their condition has been significantly improved after weight loss and insulin sensitivity treatment [12]. Studies in the past 20 years have found that in patients with polycystic ovarian syndrome, the level of leptin rises and the level of leptin increases [13], which can directly supplement the level of subtle receptors, and can also drive anti-leptin to prevent the receiver behind Signal transmission, promote the secretion of leptin, can lead to hyperleptinemia. Visfatin is significantly increased in PCOS. Visfatin can reflect the insulin resistance of PCOS patients better than T and TG. It can be used as a treatment and observation index for PCOS patients, and as a clinical diagnosis and treatment of polycystic ovarian syndrome treatment.

Insulin resistance (IR) and hyperinsulinemia (Hyperinsulinemia, HI) are the main pathological basis of PCOS. According to research, long-term hyperglycemia may cause oxidative stress damage to the mitochondria of pancreatic islet cells, and long-term hyperglycemia will reduce the use of glucose in peripheral tissues, leading to insulin resistance [14]. The diet of PCOS patients may increase insulin resistance.

At present, PCOS has been proved to be a disease caused by the interaction of various genetic abnormalities and environmental factors. Insulin resistance is an important cause of endocrine abnormalities in PCOS patients [15]. Abnormal changes in insulin genes and insulin receptor genes affect the insulin signaling pathway, which is an important cause of IR [16]. More and more scholars have discovered that MicroRNA (miRNA) can also participate in PCOS insulin resistance. Some gene mutations are also an important cause of hyperandrogenemia. Current studies have found that other locus mutations are involved in the pathogenesis of hyperandrogenemia [17]. In addition to the above reasons, many scholars have studied the pathogenesis of PCOS from apoptosis in recent years, and found that apoptosis is also an important factor involved in the pathogenesis of PCOS. Apoptosis is the main way of active programmed cell death in living tissues. The body regulates the balance of various physiological processes in the body through apoptosis [18-19]. In the reproductive endocrine system, apoptosis involves many processes of reproductive physiology, such as abnormal atresia during follicular development, implantation in the endometrium after embryo formation, and abnormal endometrial hyperplasia. In patients with polycystic ovarian syndrome, the ovaries are abnormally developed and are not dominant follicles, and most of the small ovaries are accumulated in the ovaries. The so-called polycystic changes of the ovary are closely related to the apoptosis of ovarian cells, especially the granulosa cells around the follicles.

2.2 Ovarian Pregnancy

Ovarian Pregnancy (OP) refers to the implantation, growth and development of fertilized eggs in the ovaries, accounting for 0.15% to 3.0% of all ectopic pregnancy (EP). The diagnostic criteria (Spiegelberg, 1878):

(1) The fallopian tube on the affected side is uninjured. Patients with assisted reproductive technology (ART) usually lack uninjured fallopian tubes. (2) The embryo sac is in the ovarian tissue [20]. (3) The cyst wall is connected by uterus and ligament tissue. (4) There is ovarian tissue on the cyst wall. This is very rare, and it is especially easy to confuse with other acute gynecological abdominal diseases [21]. There is no muscle layer around the ovaries, and the blood supply is abundant. The possibility of early water breakage leading to massive abdominal hemorrhage has become a major problem in clinical research.

The risk factors for OP mainly include the use of an endometrial device (Intrauterine device, IUD), a history of inflammatory diseases in the pelvis, previous experience of abdominal or pelvic surgery, and infertility-related treatments [22]. With the development and popularization of assisted reproductive medical treatment, this group of people is more likely to become pregnant, but the risk of EP has risen from 1%-2% to 2%-5% of the normal population. The incidence of OP, high-risk factors, clinical features, treatment options, etc. have been discussed in a large number of studies[23], but the basic characteristics of the OP population, the difference in the number of OP occurrences on the left and right sides, and preventive measures to reduce the occurrence of OP in infertile populations Few research reports.

ISSN 2706-6819 Vol.3, Issue 5: 7-20, DOI: 10.25236/IJFM.2021.030502

2.3 Auxiliary Diagnosis Method of Machine Learning and Intelligent Medical Treatment

The development of science and technology has promoted the development and improvement of intelligent systems. In modern medicine, the intelligent medical auxiliary diagnosis system can effectively help medical staff, provide fast and accurate examination results for their diagnosis [24], and build a more complete treatment system for patients. The intelligent medical auxiliary diagnosis system combined with the medical staff's diagnosis and treatment experience can greatly improve the diagnosis efficiency and accuracy. Figure 1 is a picture of smart medical care (this picture is borrowed from Baidu Gallery: https://wenku.baidu.com/view).

Figure 1: Smart medical

(1) Principal component analysis method

Principal component analysis is a classification system based on machine learning, also called principal component analysis, which are statistical techniques based on dimensionality reduction methods [25]. The principle is to transform a large number of original variables into a new set of variables that are not related to each other after processing, and the recombined variables can reflect the information of the original variables [26].

Analysis steps of principal component analysis：

1) Data standardization:

$$X_{mn} = \frac{x_{mn} - \bar{x}_n}{D_n}, m = 1,2,\cdots, N; n = 1,2,\cdots, p \tag{1}$$

among them，

$$\bar{x}_n = \left[\sum_{m=1}^{N} x_{mn}\right] / N \tag{2}$$

$$D_n^2 = \left[\sum_{n=1}^{p} \left(x_{mn} - \bar{x}_n\right)^2\right] / \left(N-1\right) \tag{3}$$

2) Calculate the correlation coefficient matrix:

$$T = \left[t_{mn}\right]_p xp = X^Y X / \left(N-1\right) \tag{4}$$

among them，

$$t_{mn} = \left[\sum X_{lk} X_{lk}\right] / \left(N-1\right), m, n = 1,2,\cdots, p \tag{5}$$

3) Solve the matrix to determine the number of principal components:

$$\left|T - \omega O_p\right| = 0 \tag{6}$$

ISSN 2706-6819 Vol.3, Issue 5: 7-20, DOI: 10.25236/IJFM.2021.030502

$$\left|\sum_{n=1}^{u}\omega_n\right| / \left|\sum_{n=1}^{p}\omega_n\right| \geq 0.85 \tag{7}$$

Solve formula (6) to get the characteristic root of the equation, and determine the value of O.

Find each $\omega_n, n=1,2,\cdots,u$ equation $Tb=\omega_n b$ to get the characteristic vector b_n^o.

4) Principal component generation

$$I_{mn}=X_m^T b_n^o, n=1,2,\cdots,u \tag{8}$$

Among them I_1, I_2, I_3 are the first, second, and third principal components, and so on as I_u the u-th principal component.

5) Principal component evaluation

The u principal components $I_1, I_2, \cdots, I_U$ are first weighted and then summed to obtain the evaluation value, where the variance contribution rate is the weight value.

According to the above analysis of principal components, its advantages are: 1) It can eliminate the influence of the relationship between variables. 2) It can reduce the workload when selecting variables. 3) Reducing variables and reducing workload will not affect the evaluation effect. Disadvantages: 1) The cumulative power of the extracted principal components must reach or exceed 85%, and these principal components meet the requirements, otherwise it has no practical significance for the target research. 2) The concept of the principal component variable will become more ambiguous than the concept of the original variable after dimensionality reduction. 3) If the factor loading in the factor loading matrix is positive or negative, the meaning of the comprehensive score function Fm is not so clear.

(2) Support vector machine

Support Vector Machines (SVM) is a data mining technology that uses optimized methods to solve related problems in machine learning. This method has made great progress in recent years and has become an important method to solve problems such as "over-learning" and "dimension disaster".

According to the given training set:

$$U=\{(x_1,y_1),(x_2,y_2),\cdots,(x_u,y_u)\}\in(X\times Y)^u \tag{9}$$

Among them $x_i\in X=R^n, y_i\in Y=\{-1,1\}, i=1,\cdots,p$. Find R^n a real-valued function $h(x)$ on in order to use the classification function：

$$j(x)=\mathrm{sgn}(h(x)) \tag{10}$$

Remember the two types of sample sets are respectively $Q^+=\{x_i|y_i=1,x_i\in U\}$, $Q^-=\{x_i|y_i=-1,x_i\in U\}$. Define the convex hull of M+ as $con(Q^+)$:

$$con(Q^+)=\left\{x=\sum_{j=1}^{N_+}\omega_j x_j \middle| \sum_{j=1}^{N_+}\omega_j=1,\omega_j\geq 0, j=1,\cdots,N^+; x_j\in Q^+\right\} \tag{11}$$

The convex hull is：

$$con(Q^-)=\left\{x=\sum_{j=1}^{N_-}\omega_j x_j \middle| \sum_{j=1}^{N_-}\omega_j=1,\omega_j\geq 0, j=1,\cdots,N^-; x_j\in Q^-\right\} \tag{12}$$

Prove its necessity：

If U is linearly separable, from the definition of $Q^+=\{x_i|y_i=1,x_i\in U\}$, $Q^-=\{x_i|y_i=-1,x_i\in U\}$, linearly separable, we know that there is a hyperplane such that：

ISSN 2706-6819 Vol.3, Issue 5: 7-20, DOI: 10.25236/IJFM.2021.030502

$$\begin{cases} (\xi \cdot x_i) + b \geq \phi, \forall x_i \in N^+ \\ (\xi \cdot x_i) + b \leq -\phi, \forall x_i \in N^- \end{cases} \tag{13}$$

And any point in the convex hull of the positive point set and any point in the convex hull of the negative point set can be expressed as:

$$\begin{cases} x = \sum_{i=1}^{M_+} \beta_i x_i \\ x' = \sum_{j=1}^{M_-} \chi_i x'_j \end{cases} \tag{14}$$

Among them,

$$\begin{cases} \beta_i > 0, \chi_i \geq 0 \\ \sum_{i=1}^{M_+} \beta_i = 1, \sum_{j=1}^{M_-} \chi_i = 1 \end{cases} \tag{15}$$

So you can get:

$$(\xi \cdot x) + b = \left(\xi \cdot \sum_{i=1}^{M_+} \beta_i x_i \right) + b = \sum_{i=1}^{M_+} \beta_i ((\xi \cdot x_i) + b) \geq \phi \sum_{i=1}^{M+} \beta_i = \phi > 0 \tag{16}$$

It can be seen that the convex hull of the set of positive and negative points $(\xi \cdot x) + b = 0$ is located on both sides of the hyperplane.

3. Relationship between Ovarian and Systemic Immune Cell Homeostasis and the Level of Autophagy in Patients with Polycystic Ovary Syndrome during Pregnancy

In this chapter, experiments on ovarian and systemic immune cell homeostasis and autophagy levels in PCOS patients during pregnancy are carried out. A comparison experiment between PCOS patients and healthy controls is used to perform serum tests and glucose tolerance tests. Biochemical indicators, hormone indicators, blood glucose indicators and insulin are selected. And other indicators, and use the homeostasis model to evaluate, the purpose is to study the relationship between ovarian and systemic immune cell homeostasis and the level of autophagy in PCOS patients during pregnancy.

3.1 Experimental Research Objects

The research objects in this article mainly collected patients who were admitted to the endocrinology department of Y Hospital from June 2018 to February 2019. A total of 158 patients were 22-36 years old, with an average age of (25.68±3.22) years old.

Experimental group (PCOS group): A total of 88 patients, with an average age of (21.58±2.29) years.

Control group (healthy group): A total of 70 patients with an average age of (23.58±3.01) years old. The main cause of treatment is male factors or fallopian tube factors (normal menstrual cycle, normal sex hormone levels and ultrasound examination to exclude polycystic ovaries).

3.2 Research Methods

(1) Physical examination

All research subjects were given detailed medical history and physical examination, and all anthropometric items were completed by the same operator. Height measurement method: When measuring, the heels are closed, the feet are kept at 45 degrees, the back is facing the height measuring instrument, the head, waist, and feet are facing the opposite side of the height gauge, and the head is perpendicular to the height of the instrument column. The measurement break point is the height

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indicator. Weight measurement method: The test subject does not wear shoes, do not take off clothes, and does not observe the reading of the weight measurement device, and stands upright on the basis of the weight measurement device. The weight needs to be accurate to an electronic scale of 0.1kg. Method of measuring blood pressure: The patient is sitting or lying down to measure blood pressure. The elbow and heart rate monitor should be at the same height as the heart (the seat position is the same as the fourth rib height, and the lower position is the same as the center angle). Use the impulse force meter on the working surface 3 times and take the average value. Body mass index (BMI) = weight (kg)/height (m2).

(2) Blood examination and testing

All subjects were in the menstrual cycle for 2 to 4 days (the day when there was no dominant follicle in the patients with amenorrhea on the B-ultrasound examination), fasted for more than 12 hours overnight, and took 5ml of cubital vein blood the next morning. Using an automatic chemical analysis device made by a certain company, the blood glucose level and blood lipids were measured. The lipid indicators in the blood during fasting include triglycerides (TG), total cholesterol (TC), high-density lipoprotein cholesterol (HDL-C), and low-density lipoprotein cholesterol (low LDL-C). Sex hormones and insulin were measured using a chemiluminescence analyzer made by Beckman, USA. Sex hormone indicators include luteinizing hormone (LH), follicle stimulating hormone (FSH), estradiol (E2), progesterone (P), total testosterone (TT) and prolactin (PRL).

(3) Glucose tolerance test

The two groups of patients took 75g glucose orally on an empty stomach. Observation experiments were performed on the patients 30min, 60min, and 120min after taking them, and the blood insulin and blood glucose levels of the patients were measured. Finally, the homeostasis model assessment insulin resistance index (HOMA-IR) calculation formula is used: fasting insulin×fasting blood glucose/22.5. The diagnostic criteria for PCOS patients with insulin resistance is HOMA-IR>2.77.

3.3 Diagnostic Criteria

The diagnostic criteria for PCOS follow the Rotterdam diagnostic criteria jointly established by the European Society of Human Reproduction and Embryology/American Society of Reproductive Medicine (ESHRE/ASRM) in May 2003: 1) oligomenorrhea or amenorrhea; 2) hyperandrogenism and/or male Hormone hyperplasia, including clinical manifestations such as acne, alopecia, hirsutism, etc.; 3) Vaginal ultrasound or pelvic ultrasound examination shows: at least one follicle with a diameter of 2-9mm on one side of the ovary is ≥12, or/and the ovarian volume is ≥10ml; meet the three items At least two, and exclude congenital adrenal hyperplasia, androgen-stimulated tumors, Cushing syndrome, hyperprolactinemia, hypothalamic amenorrhea, primary ovarian insufficiency and other diseases.

Exclusion criteria: 40 years or older, smoking, severe cardiovascular disease, hypertension (blood pressure>140/90mmHg), diabetes, tumor, renal failure (serum creatine>120mmol/l), osteoporosis, thyroid disease, side effects Endocrine system diseases such as thyroid disease, lettuce, cauliflower, etc. that affect vitamin levels. Take oral contraceptives, steroids and other drugs within 2 weeks. Have a history of bone fractures within 6 months and have taken drugs that affect vitamin K.

3.4 Statistical Methods

All the research data in this paper use SPSS19.0 for data sorting and analysis, the measurement data is expressed by x±s, and the t test method is used. Judgment of the independence of influencing factors are used P<0.05 to indicate statistical significance. Figure 2 shows the homeostasis and imbalance of cells and viruses (this picture is borrowed from Baidu Gallery: https://wenku.baidu.com/view).

ISSN 2706-6819 Vol.3, Issue 5: 7-20, DOI: 10.25236/IJFM.2021.030502

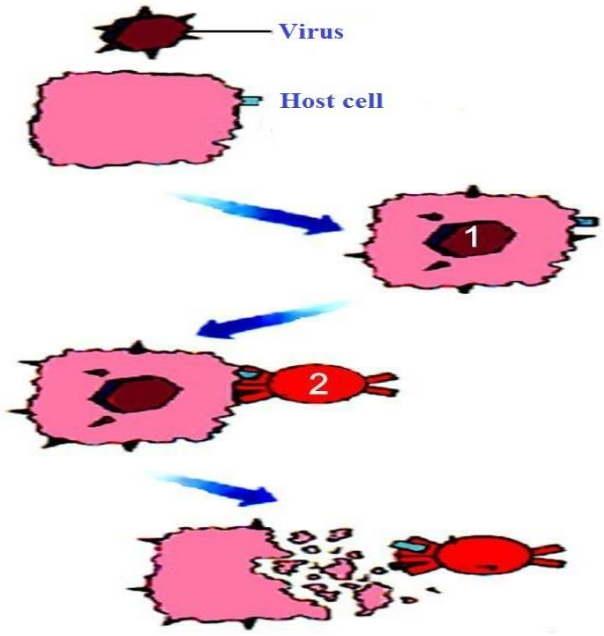

Figure 2: Homeostasis and Disorders of Cells and Viruses

4. Relationship between the Homeostasis of Ovarian and Systemic Immune Cells and the Level of Autophagy in Patients with Polycystic Ovary Syndrome during Pregnancy

4.1 Comparison of General Data and Biochemical Characteristics between PCOS Patients and the Control Group

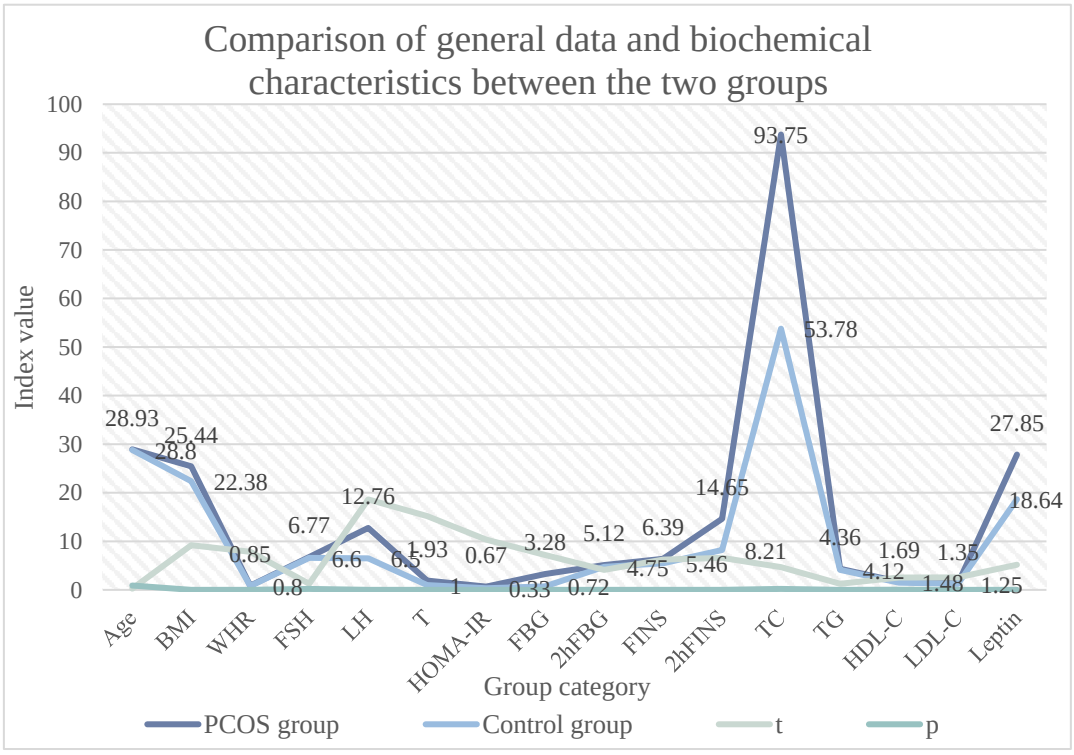

Figure 3: Comparison of general data and biochemical characteristics between the two groups

As shown in Figure 3, there were 88 cases in the PCOS group, aged 22 to 37 years, with an average of 27 years old; 70 healthy controls, aged 20 to 30 years, with an average of 26 years old. There was no statistical difference between the two groups in age matching. The BMI, SBP, and DBP of the PCOS

ISSN 2706-6819 Vol.3, Issue 5: 7-20, DOI: 10.25236/IJFM.2021.030502

group were significantly higher than those of the control group, and the difference was statistically significant.

4.2 Correlation Analysis between the Serum Levels of the Two Groups of Patients and Clinical Biochemical Indicators

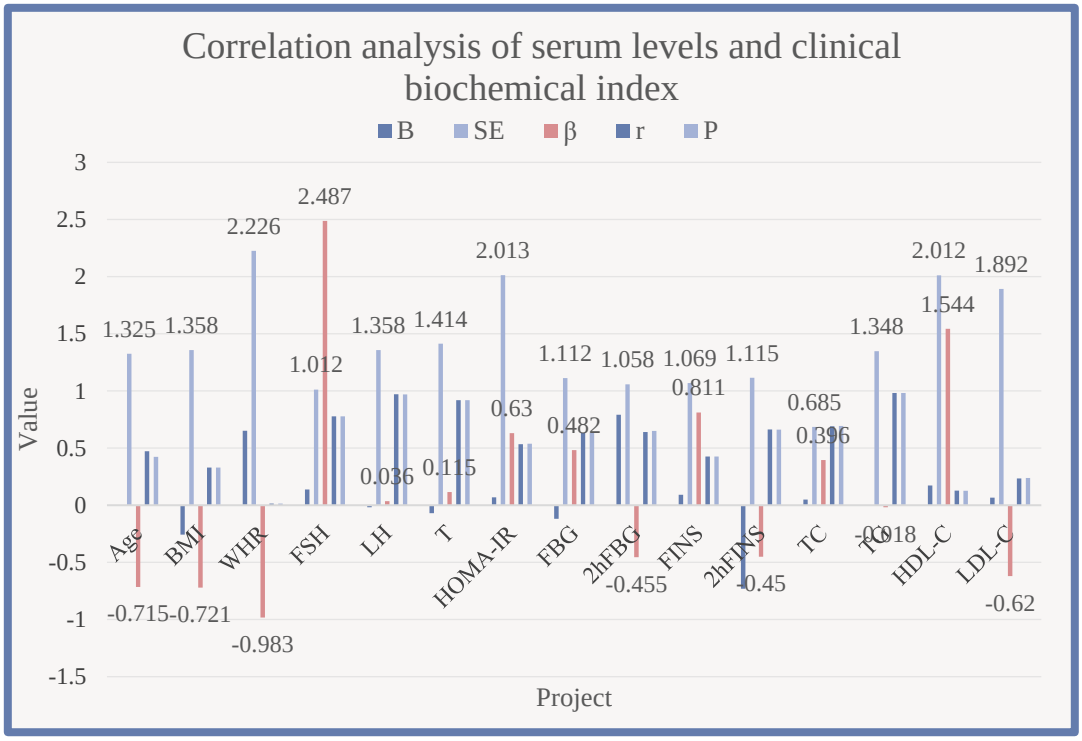

Figure 4: Correlation analysis of serum levels and clinical biochemical index

B partial regression coefficient, SE standard error, β means standardized partial regression coefficient, P value means whether it is statistically significant, and the correlation coefficient is r. It can be seen from Figure 4 that through the correlation analysis of the two groups of patients, it is found that the serum levels of the 88 PCOS patient groups have no correlation with the number of eggs obtained, the fertilization rate, the number of 2PN, and the number of excellent embryos. The serum level in the PCOS group was negatively correlated with the rate of good embryos (r=-0.891, p=0.001). In the 88 PCOS patient group, the clinical biochemical indexes were not related to the number of eggs obtained, the fertilization rate, the number of 2PN, the number of excellent embryos, and the rate of excellent embryo.

4.3 Comparison of Some Indicators of the Two Groups of Patients

Table 1: Comparison of blood lipids between the two groups

Project	PCOS group	Control group	T	P
TC(mmol/l)	4.78±0.12	4.57±2.24	1.13	0.13
TG(mmol/l)	2.53±1.14	0.98±0.03	2.24	0.011
HDL-C(mmol/l)	1.26±1.15	1.41±0.12	3.48	0.015
LDL-C(mmol/l)	2.33±2.16	2.23±0.31	5.12	0.24

It can be seen from Table 1 that the two groups have no statistical difference in TC and LDL-C, but have statistical significance in TG and HDL-C. From the specific data, the experimental group (PCOS group) is significantly higher than the control group in the three levels of TC, TG, and LDL-C, and is lower in HDL-C than the control group.

Table 2: Comparison of insulin resistance index between the two groups

Project	FBG	FINS	HOMA-IR
PCOS group	5.23±1.12	19.74±1.06	4.68±2.01

ISSN 2706-6819 Vol.3, Issue 5: 7-20, DOI: 10.25236/IJFM.2021.030502

Control group	5.18±1.14	6.69±1.18	1.58±3.12
T	3.34	2.52	6.61
P	0.12	0.01	0.01

It can be seen from Table 2 that the comparison between the two groups at the FBG level is not statistically significant, P>0.05; there is a significant difference between FINS and HOMA-IR, which is statistically significant, P<0.05. And the experimental group is in both levels are higher than the control group.

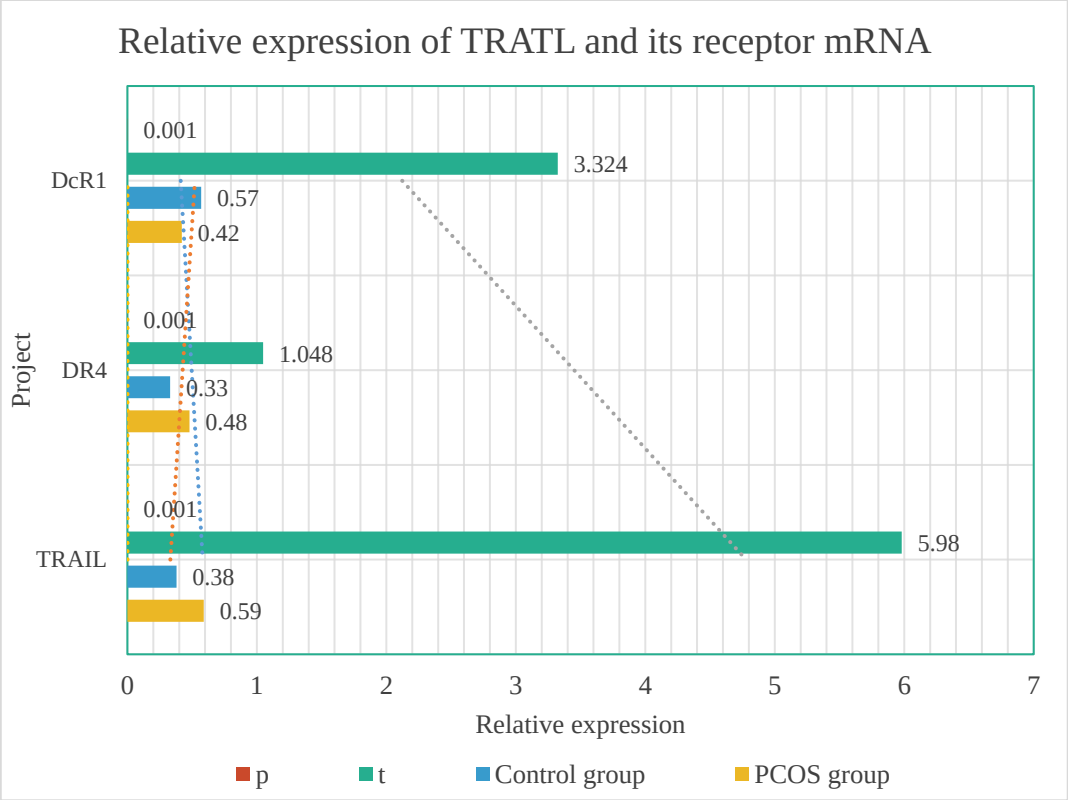

Figure 5: Relative expression of TRATL and its receptor mRNA

Figure 5 shows the relative expression of receptor proteins in the experimental group and the control group. In terms of DcR1 level, the experimental group is lower than the control group; in terms of DR4, the experimental group has a higher value than the control group; on TRAIL, the experimental group performs better than the control group.

Table 3: Comparison of sex hormones between the two groups

Project	PCOS group	Control group	T value	P value
E2	59.73±3.34	159.42±4.45	3.32	0.001
TT	0.67±2.28	0.43±3.32	1.58	0.002
LH	10.28±5.56	9.93±6.64	6.62	0.52
FSH	5.54±1.42	5.45±0.28	5.25	0.24
PRL	13.66±2.25	19.33±2.58	3.29	0.28
P	2.12±0.12	6.69±3.24	4.15	0.019

It can be seen from Table 3 that the P values in the LH, FSH, and PRL levels of the PCOS group and the control group were all greater than 0.05. At the TT level, the experimental group was 0.67 and the control group was 0.43, indicating that the PCOS group was higher than the control group; at the E2 level, the experimental group was 59.73 and the control group was 159.42; at the P level, the experimental group was 2.12. The control group was 6.69. At these two levels, the experimental group is significantly lower than the control group, which is statistically significant.

ISSN 2706-6819 Vol.3, Issue 5: 7-20, DOI: 10.25236/IJFM.2021.030502

4.4 Comparative Analysis of the Protein Expression Levels of the Two Groups of Patients

Table 4: TRAIL and its receptor protein expression

Project	PCOS group	Control group	t	p
TRAIL	0.44±0.01	0.33±0.10	-2.891	0.001
DR4	0.35±0.02	0.29±0.12	-1.384	0.172
DcR1	0.31±0.01	0.41±0.08	3.077	0.001

It can be seen from Table 4 that the expression of TRAIL protein in follicular granulosa cells in the PCOS group was higher than that in the control group (P<0.05); the relative expression of DR4 protein in the PCOS group was higher than that in the control group (P>0.05); the expression of DcR1 protein in the PCOS group The amount is reduced compared with the control group (P<0.05).

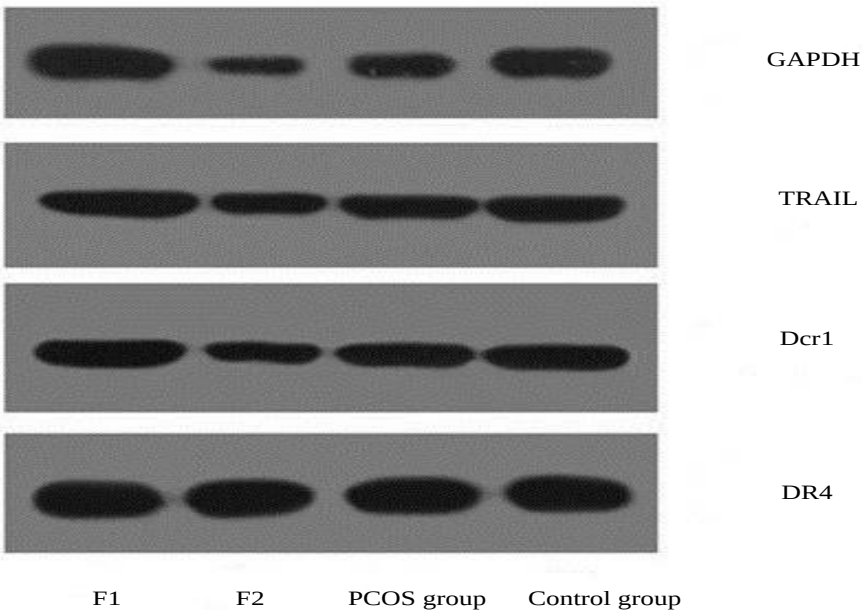

Figure 6: Comparison of protein expression levels between the two groups

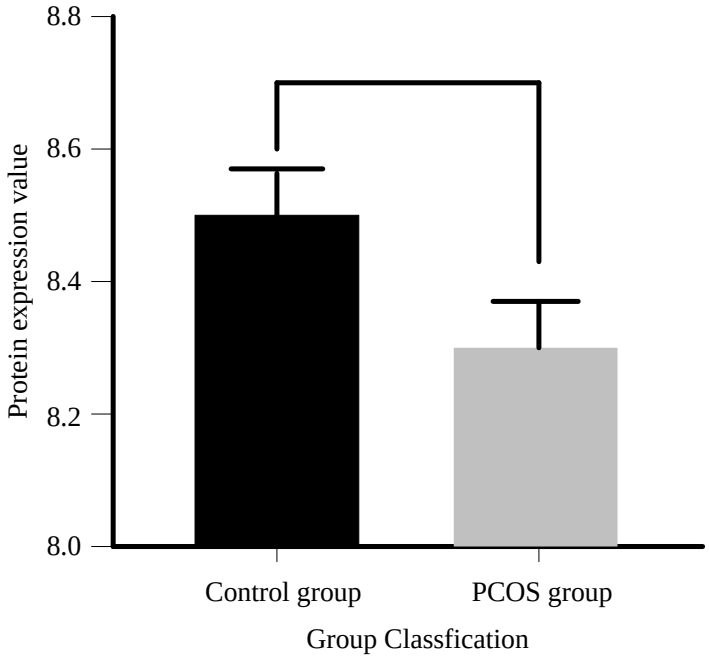

Figure 7: Difference in protein expression between experimental group and control group

We found from Figure 6 and Figure 7 that through qRT-PCR experiments, the expression of TRAIL

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mRNA in the granulosa cells of PCOS patients and the control group was compared. The relative performance of TRAIL mRNA in the PCOS group was higher than that of the control group. . In addition, the relative discovery of TRAIL protein in the polycystic ovarian syndrome group is also higher than that of the control group. TRAIL causes cell weakness in PCOS patients and plays an important role in the etiology of PCOS. The relative performance of dcr1 mRNA and Dcr1 protein was weaker than that of the control group. Therefore, it can be speculated that the protective effect of Dcr1 on granulosa cells in PCOS patients is weakened. In normal granulosa cells, Dcr1 plays a protective role on the cells. The lack of protective granulosa cells may lead to abnormal apoptosis, resulting in abnormal antral follicle development, inability to form mature follicles and ovulation, which may be the basis of anovulation in PCOS patients. When TRAIL and its receptors DR4 and DcR1 are abnormally expressed on preantral follicles, apoptosis is reduced, which further leads to damage to the follicular atresia process, resulting in the production of a large number of small follicles, and thus resulting in polycystic ovarian changes.

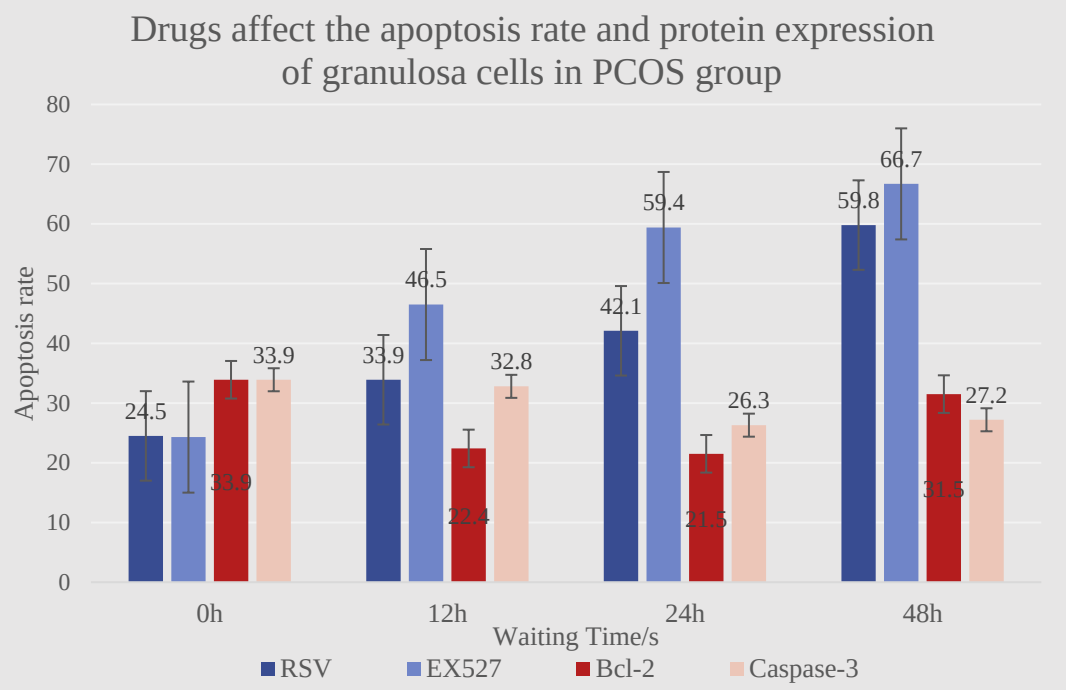

Figure 8: Drugs affect the apoptosis rate and protein expression of granulosa cells in PCOS group

Figure 8 shows the histogram of the reduction of granulosa cells in the PCOS group after RSV (100 μM) and EX527 (100 μM) treatment for 12 hours, 24 hours, and 48 hours. The control group non-drug granule cells were used as a comparison control, and the PCOS group was treated with RSV (100 μM) and EX527 (100 μM). The apoptosis rate of cells treated with EX527 (100 μM) is higher than that of granulosa cells treated with RSV (100 μM).

5. Conclusion

This article mainly studies the relationship between ovarian and systemic immune cell homeostasis and autophagy levels in patients with polycystic ovary syndrome during pregnancy. Using literature data, experimental analysis, data comparison and other research methods, the patient's serum test level is analyzed. And the glucose tolerance test level, through the homeostasis model evaluation, the relationship between the immune cell homeostasis imbalance and the level of autophagy is obtained. The patient's biochemical characteristics, insulin resistance level and protein expression level will affect cell homeostasis and autophagy. The study in this article has statistical differences. The innovation of this article lies in the combination of intelligent medical technology, the analysis of immune cell homeostasis and autophagy through experimental comparison, and the observation of the impact and relationship between the two. It is hoped that the research in this article can provide a theoretical basis and treatment basis for the treatment of polycystic ovary syndrome, provide more guarantees for women health, improve women quality of life, and reduce the economic burden and pressure on society.

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