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Research Article

Prognostic Value of Th-22 Cells and Related Functional Cytokines in Patients with Vitiligo

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Abstract: Objective: To investigate the prognostic value of Th-22 cells and related functional cytokines in patients with vitiligo. **Methods:** Thirty-five patients with vitiligo who admitted to the outpatient clinic from June 2016 to November 2018 in the hospital were selected as the study group. Thirty healthy controls were selected as the control group. Th-22 cells and their related cytokines were analyzed in both groups. **Resylts:** The levels of cytokines in Th-22 and Th-17 cells in the study group were significantly higher than those in the control group ($P<0.05$). The expression of Treg lymphocyte-related factors in the study group was lower than that in the control group ($P<0.05$). The changes in cell and factor levels in patients with vitiligo before and after treatment were significantly different ($P<0.05$). **Conclusion:** It is shown that three cells, including Th-22, Th-17 and Treg are related to each other, and they can inhibit and promote the pathogenesis of vitiligo which provides a reference for prognosis and treatment.

Keywords: *Th-22 cells; related functionalities; cytokines; patients with vitiligo*

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1 Introduction

Vitiligo is a common pigmented skin disease where its cause is complicated. Its appearance, which is destructive has a serious impact on the physical and mental health of patients[1]. In order to investigate the prognostic value of Th-22 cells and related functional cytokines in patients with vitiligo, thirty-five cases of vitiligo patients from the hospital from June 2106 to November 2018 were selected for observation. The results are as follows.

2 General information and methods

2.1 General information

Thirty-five patients with vitiligo who were treated in the outpatient clinics of the hospital from June 2016 to November 2018 were selected as the study group while thirty healthy people in the same period were selected as the control group. Among them, there were 18 males and 12 females in the control group, aged 39–60 years and the average age was (48.77±3.20) years old. The study group consists of 21 males and 14 females, aged 38–62 years and the average age was (49.64±4.22) years old. There is no significant difference in other information. Exclusion criteria: lactating or pregnant women; those who did not sign informed consent; those with primary chronic disease, cardiovascular and cerebrovascular diseases and a history of mental illness.

2.2 Method

Peripheral venous blood collection of 3–5 ml was performed in both groups. The individual nucleated cells were separated in proportion using PBS solution and centrifuged at a speed of 4000 rpm before cryopreserving at a low temperature. The expression level of IL-22 and IL-17 were detected by enzyme-linked immunosorbent assay[2]. The serum samples were thawed and diluted before centrifuging for 20 min at the speed of 2000 rpm. The supernatant was collected and used as a test for related proteins to detect the relevant cellular proteins. Thirty-five patients with vitiligo were treated with oral, topical and phototherapy (308 excimer laser or NB-UVB). The treatment cycle

was three months to obtain therapeutic effects. The peripheral venous blood of the patients before and after treatment was taken.

2.3 Statistical analysis

The final data obtained from the study were analyzed using SPSS 22.0 statistical software.

3 Results

3.1 The expression levels of IL-22 and IL-17 in two groups

Before treatment, the levels of Th-22 and Th-17 cell-associated cytokines in the study group were significantly higher than those in the control group (*P<0.05*), that is the expression levels of IL-22 and IL-17 in the vitiligo group were higher than those in the normal group. As shown in Table 1.

Table 1. Comparison of IL-22 and IL-17 between the two groups ($\bar{x}$±s, ng/mL)

Group	Number of cases	IL-22	IL-17
Study group	35	37.10±15.44	118.91±60.44
Control group	30	20.36±6.65	43.42±26.15
T		5.512	6.345
P		0.000	0.000

Note: *$P<0.05$ compared with the control group

3.2 Foxp3 expression in two groups

Before treatment, the expression of Treg lymphocyte-related factors in the study group was lower than that in the control group (*P<0.05*). That is, Foxp3 expression in vitiligo patients was lower than in normal. As shown in Table 2.

Table 2. Comparison of Foxp3 in both groups of patients ($\bar{x}$±s, ng/mL)

Group	Number of cases	Foxp3
Study group	35	110.11 ± 65.20
Control group	30	230.65 ± 85.87
T		6.423
P		0.000

Note: *$P<0.05$ compared with the control group

3.3 The changes in cell and factor levels

The changes in cell and factor levels in patients with vitiligo before and after treatment were significantly different (*P<0.05*). As shown in Table 3.

Table 3. Comparison of IL-22, IL-17 and Foxp3 before and after treatment in the study group ($\bar{x}$±s, ng/mL)

Group	Number of cases	IL-22	IL-17	Foxp3
Before treatment	35	37.10±15.44	118.91±60.44	110.11±65.20
After treatment	35	25.41±5.32	64.48±20.15	182.30±60.50
T		5.512	6.345	4.805
P		0.000	0.000	0.000

4 Discussion

Th-22 cells achieve biological activity through IL-22, which preferentially expresses skin-homing receptors CCR10 and CCR4, which are closely related to skin homeostasis and skin physiology and pathology[3]. The target of the cell is a tissue which can express IL-22 receptors such as liver or skin. At the same time, studies have also shown that IL-22 can cause keratin to undergo epithelial cell proliferation and cell growth, which are important for remodelling the epidermis of the skin. In addition, IL-22 can also be involved in the production of anti-microbial peptides in protecting the immune diseases and other inflammatory diseases and immunopathological processes. Th-17 cells can play a role in inflammation, tumours and autoimmune

diseases where IL-17 is biologically expressed in the cell. Related studies have found that the trend of serum IL-17 levels in patients with vitiligo was significantly increased and it is also positively correlated with leukoplakia and disease course[4]. IL-17 acts on melanocytes cultured in vitro to cause contraction of the melanocytes and decrease the melanin levels. It shows that IL-17 cytokines inhibit melanin synthesis while also suppress melanocyte biological activity. The levels of Th-22 and Th-17 cell-associated cytokines in the study group were significantly higher than those in the control group ($P<0.05$). Treg cells act as a phenotype through Foxp3, CD4 and CD5, and negatively regulate the immune response in humans. In this cell, Foxp3 is a key transcription factor and a specific marker which has the characteristics of controlling Treg differentiation, proliferation and binding to chromosome specificity, thereby plays a role in immunoregulation. Related studies have shown that[5] Treg lymphocytes can cause hair colour recovery in the skin of vitiligo mice, indicates that Treg cells play an important role in the pathophysiology of vitiligo. In contrast, the expression of Treg lymphocyte-related factors in the study group was lower than that of the control group ($P<0.05$). After symptomatic treatment, the related functional cytokines of vitiligo patients were improved.

In conclusion, experiments have shown that three cells, such as Th-22, Th-17 and Treg, are related to each other. Those three cells mutually inhibit and promote the pathogenesis of vitiligo and thus provide a reference for prognosis and treatment.

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