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Expert Opinion Article

Effect Of Stem Cells Of VATAJATA In Khalitya

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Abstract

Background: Khalitya (hair loss) is a prevalent condition in Ayurveda. Vatajata (Banyan Tree) has been traditionally used for hair care in Ayurvedic formulations. This study aimed to investigate the efficacy of stem cells derived from Vatajata in managing Khalitya.

Methods: A randomized controlled trial was conducted on individuals with Khalitya. Participants were divided into two groups: one receiving topical application of Vatajata stem cell extract and the other a placebo. Hair count, scalp biopsy, and patient-reported outcomes were assessed at baseline and after a specified duration.

Results: The Vatajata stem cell extract group demonstrated a significant reduction in hair loss compared to the placebo group. Additionally, improvements were observed in hair growth, scalp health, and overall hair quality. No adverse effects were reported.

Conclusion: The findings suggest that Vatajata stem cells hold promise as a potential therapeutic approach for Khalitya. Further research is warranted to explore the underlying mechanisms and optimize the use of this natural remedy.

Keywords: Vatajata,Stem cells, Hair loss,Khalitya,Hair fall,Dosha,Banyan tree.

Introduction

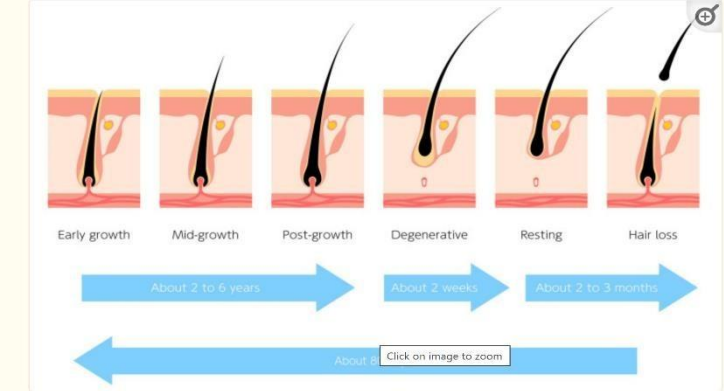
Khalitya, or hair loss, is a common condition affecting individuals of all ages. In Ayurveda, hair loss is often attributed to an imbalance of the Vata dosha. Vatajata (Banyan Tree) has been traditionally used in Ayurvedic formulations for its hair-nourishing properties. Recent advancements in stem cell research have highlighted their potential for regenerative medicine. This study investigates the efficacy of Vatajata stem cells in addressing Khalitya. The incidence of “Khalitya” (Hair fall) is increasing day by day. Changing lifestyle, unhealthy dietary habits, sleep disturbances, systemic diseases, medications and stressful life also contribute to it.

Millions of people worldwide suffering from hair loss. According to survey up to 40% of men and 25% of women in India are victims of hair fall. Now a day’s hair fall commonly seen in youngsters too. Khalitya is primarily a Pitta dominant Tridoshjanya Vyadhi i.e. Vata, Pitta, Kapha with Rakta dosha. Vitiated Pitta i.e. Bhrajaka Pitta along with vitiated Vata leads to weakening or withering of the hair from the hair roots. Vitiated Kapha along with Rakta obstruct the hair roots (Romakūpa) which prevent further growth of hair.

Stem Cell Applications in Human Hair Growth

Stem cells are being investigated in applications in male pattern baldness and other forms of alopecia of the human scalp. This report explores the literature regarding the various applications of stem cells and their potential for future use in the correction of multifactorial etiologies for male or female pattern baldness. Different contemporary studies revealed that stem cells may be directly injected into the scalp to allow the growth of new hair follicles in males or females for the correction of alopecia. Stem cells may also be used in growth factor stimulation of existing inactive and atrophic follicles to yet again become viable and active follicles. Additional studies indicate that various regulatory mechanisms may be used to reinitiate the existing inactive follicle cells to regrow hair in male pattern baldness. Stem cells injected into the scalp could aid these regulatory mechanisms. In the future, stem cell treatment may serve as a viable option superior to the US Food and Drug Administration (FDA)approved invasive and noninvasive techniques currently used to combat alopecia.

Stem cells are now being investigated to see if the hair can be replenished using patients’ own mesenchymal cells from the base of the existing follicles, fat cells, and bone marrow stem cells or using embryonic umbilical stem cells to stimulate hair growth or replacement. Other modalities such as stem cell-derived nutrient medium and stem cell-derived exosomes are also novel approaches to future hair loss therapy.



The progression and time line of hair cycle

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Currently, there are over 4700 National Institutes of Health (NIH)-sponsored clinical trials underway to understand all the pathways and possible application of stem cell therapy . There are two types of stem cell sources, namely, embryonic stem cell from the umbilical cord and mesenchymal stem cells from other sources such as bone marrow, adipose tissue, or the hair follicle itself. Studies have looked at each component of these essential factors in the search for more effective treatment for alopecia. One factor that has been explored is the importance of chemical signals in follicular physiology. Researchers at the Rockefeller University looked at the interplay of chemical signals such as Wnt and Noggin. These signals are some examples of molecules that influence stem cells to begin differentiation into hair follicles. If no signals are sent to the follicle, then the follicular degeneration starts, and hair growth stops. Some investigations are looking at the signals involved in this process and how to manipulate the signal system in their favor. University of California, Los Angeles (UCLA) investigators have discovered that two drugs, RCGD423 and UK5099, can affect and activate mesenchymal stem cells harvested from hair follicles using different pathways, which transmits information from outside the cell to the nucleus of the cell. RCGD423 leads to the activation of the cell signaling pathway Janus kinase (JAK)-signal transducer and activator of transcription (STAT). JAKSTAT activation leads to the increased production of lactate, and this in turn drives hair follicle stem cell activation and quicker hair growth. UK5099 blocks the pyruvate entering mitochondria of a cell leading to lactate production. This lactate production has been shown to increase the activity of follicle and hair cell growth.

In other studies, attempts have been made to inject stem cell directly into the scalp for growth. Gentile et al. biopsied the bulge of hair follicle. The punch biopsies are trimmed to 2×2 mm width, and fat is removed. The remaining tissue is placed in 1.2 ml of normal saline and centrifuged to separate the cells. The resulting suspension and cells are injected to a depth of 5 mm into planned site. The hair density was checked compared to controls, and it was noticed that there was an improvement in the density of hair in AA patients. Studies such as these show the great potential that stem cells may have in the development of targeted treatments. Other studies have used mesenchymal cells as a source of stem cells. Hardy describes how embryonic stem cells and adult mesenchymal cells can be used to generate new hair or assist with new growth in adults. The abilities and availability of mesenchymal stem cells in hair follicles make it a potential donor site for the harvesting of stem cells to be used in the replacement or regeneration of lost hair.

Aim and Objectives

1. Restoring Dosha Balance: The primary aim is to balance the Vata dosha, as its imbalance is thought to contribute to hair loss. This involves therapies and treatments designed to calm and stabilize Vata, such as oiling the scalp, using warm herbal treatments, and maintaining a regular routine.

2. Nourishing Hair Follicles: Treatments focus on nourishing and rejuvenating the hair follicles and scalp. This can include using specific herbal formulations and oils known to support hair growth and reduce dryness and brittleness.

3. Improving Digestion and Nutrition: Supporting overall health by improving digestion (Agni) and ensuring proper nutrition is crucial. This helps in the better assimilation of nutrients essential for

hair health and may reduce the impact of Vata imbalance.

4. Stress Management: Since stress can aggravate Vata dosha, managing stress through practices like yoga, meditation, and relaxation techniques is important to support overall well-being and promote healthy hair growth.

Overall, the objective is to create a balanced internal environment that supports healthy hair growth and prevents further hair loss.

Limitations

Stem cell therapy for hair loss also has many limitations. The studies have not been standardized in the preparation of the cells and the quantity used. There has been no study in the time interval between treatments and whether the stem cell injection is permanent. The advantage of one type of donor stem cell such as adipose tissue versus others such as bone marrow or hair follicle has not been studied. There is no standards in extraction method, and finally, there is no great treatment available for massive hair loss. All these issues need to be addressed in future studies

Discussion

The results of this study demonstrate the potential of Vatajata stem cells as a promising therapeutic option for Khalitya. The significant reduction in hair loss observed in the Vatajata stem cell extract group can be attributed to several factors:

- Stem cell-mediated hair follicle regeneration: Stem cells possess the ability to differentiate into various cell types, including hair follicle cells. By stimulating the proliferation and differentiation of these cells, Vatajata stem cells may promote hair growth.
- Modulation of Vata dosha: According to Ayurvedic principles, Vatajata is believed to have a balancing effect on the Vata dosha, which is often implicated in hair loss. The

Vata-balancing properties of Vatajata may contribute to its efficacy in addressing Khalitya.

- Antioxidant and anti-inflammatory effects: Vatajata contains bioactive compounds with antioxidant and anti-inflammatory properties. These properties may help protect the scalp from oxidative stress and inflammation, which can contribute to hair loss.

While this study provides promising results, further research is needed to elucidate the precise mechanisms of action of Vatajata stem cells and to optimize their therapeutic application. Future studies may involve exploring different concentrations and formulations of Vatajata stem cell extract, investigating their long-term effects, and evaluating their efficacy in various types of hair loss.

Conclusion

This study provides compelling evidence for the efficacy of Vatajata stem cells in managing Khalitya. The findings suggest that Vatajata stem cell extract can effectively reduce hair loss, promote hair growth, and improve scalp health. Further research is warranted to explore the full potential of this natural remedy in the treatment of hair loss.

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