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## Research Article

# Alopecia Areata: A Combined Sub-Dermal Infiltrative Therapy - @

Laino Luigi\*

*Rome Dermovenereologic Centre – Via Bixio, Rome – Italy*

\***Address for Correspondence:** Laino Luigi, Dermovenereologic Centre – Via Bixio, Rome – Italy  
Email: [laino@ifo.it](mailto:laino@ifo.it)

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## ABSTRACT

Alopecia areata is a common cause of hair loss seen in 3.8% of patients in dermatology clinics and in 0.2% to 2.0% of the general US population. The pathology of the disease remains poorly understood. Hair loss in alopecia areata can range from a single patch to 100% loss of body hair. When hair regrowth occurs in alopecia areata, the new hair may demonstrate pigment alterations, but a change in hair texture (ie, curly or straight) has rarely been reported as a consequence of alopecia areata.

## INTRODUCTION

Alopecia areata (AA) is a common cause of hair loss seen in 3.8% of patients in dermatology clinics and in 0.2% to 2.0% of the general US population. The pathology of the disease remains poorly understood. Hair loss in alopecia areata can range from a single patch to 100% loss of body hair. When hair regrowth occurs in alopecia areata, the new hair may demonstrate pigment alterations, but a change in hair texture (ie, curly or straight) has rarely been reported as a consequence of AA.

Several researchers have shed new light on the importance of the action of extracellular nucleotides and nucleosides in increasing cell proliferation and reducing inflammation. PDRN, an A2A adenosine receptor, acts as mitogen for fibroblasts, endothelial cells, and preadipocytes [1, 2] working with different growth factors (VEGF, PGF, and FGF). PDRN is used in plastic and dermatologic surgery, and recently in urology, for its regenerative properties, restorative effects in ischemic skin flaps [3], and being used to improve intratesticular vascularisation [4]. Recently, the effects of PDRN have been analysed in a number of tissues, such as corneal epithelium [5], human bone [6], and skin [3]. PDRN is involved in protective and regenerative effects on UV irradiated mouse cell cultures [7] and UV-irradiated dermal fibroblast [8]. PDRN has shown proliferation effects in human preadipocytes, which represent the richest reservoir of human adult stem cells [9]. In the light of these preliminary results, and because of these specific properties, we decided to perform the clinical observation, before and after therapy, of a local subdermal administration of PDRN in lichen sclerosus genital lesions, focusing on the anti-inflammatory and positive regenerative effects of this A2A adenosine receptor.

### Aim of the study

To compare, in a group of 16 patients (Group A - 10 male, 6 female, aged from 19 to 43 Year old) affected by AA, the usefulness as adjuvant therapy of polydeoxyribonucleotides, in a micro-infiltrative local sub-dermal, in combination with triamcinolone acetonide, respect to a group of AA patients who received only the micro-infiltrative triamcinolone acetonide therapy (Group B - 14 patients 9 male 5 female aged from 21 to 42 Year old).

## MATERIALS AND METHODS

### Materials

We used polydeoxyribonucleotide (PDRN) in a commercial preparation for human use, containing 5625 mg of PDRN in a 3 mL

ampoule sterilized at 121°C for 20 min. PDRN is a pure substance at 95%, constituted of different lengths of PDRN (from 50 to 2000 base pairs) obtained from sperm of salmon trout (*Oncorhynchus mykiss*) for human alimentation, through an original purification and sterilization process. In addition, for we use triamcinolone acetonide in a commercial preparation 10mg/mL

### Methods

We proposed for Group A, an 8 session therapy. In every session we performed subdermal infiltrations with PDRN addicted to triamcinolone acetonide 10mg/ml solution, corresponding to the lesions of lichen sclerosus and some neighboring areas. This was performed using a 30-gauge needle. In every session we performed subdermal infiltrations with PDRN, corresponding to the lesions of AA and some neighboring areas. The same sessions were performed for Group B, without PDRN.

## RESULTS

We have tested for all patients, significant improvements of the disease, related to a hair regrowth on all treated areas.

These improvements were more evident for group A, already from the second session, while for group B, around third/fourth session. In the group A has been possible to appreciate clinically and trichoscopically, a more homogeneous disposition of the regrowth of hair, with a normalization of the average diameters.

We observed in 8 patients of Group A, a complete regrowth of all hair, kept up to 2 months after discontinuation of treatment, while only 2 patients in group B achieved a complete regrowth, kept for 2 months after discontinuation of treatment.

## DISCUSSION

Because of these characteristics, we hypothesized that PDRN could play a role in reducing the primary cause of AA, the inflammation of the tissue, and in part, inducing tissue regeneration. We therefore wanted to challenge some of the regenerative effects demonstrated by PDRN in association with anti-inflammatory effects demonstrated by Triamcinolone acetonide 10mg/ml, that seemed to be useful to counteract the progression of AA. In particular, preliminary experiments showed that PDRN determined a statistically significant increase in fibroblast growth, as reported by Sini et al. [1]. Fibroblasts are important precursors of collagens, glycosaminoglycans, and elastic and reticular fibers glycoproteins that can be found in extracellular matrix. Stimulation of these cells may play a key role in tissue regeneration in the course of LS. Again, it has been proved that PDRN plays a role in the reduction of proinflammatory cytokines, which leads to an anti-inflammatory effect in several autoimmune diseases, as reported by Bitto et al. [2]. It is already known that the primary pathogenic path of AA is the skin inflammation. The demonstrated [3] anti-inflammatory effect of PDRN, bound to the reduction of cytokine production, may impact in some way the progression of the disease, counteracting the *primum movens* due to several pathological effects. Last, but not least, we have demonstrated the effects of PDRN in promoting growth and differentiation of human preadipocytes

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**Figure 1:** Notice the complete regrowth of the whole scalp (the images are taken monthly for 4 months).

[4], which constitute the largest and most accessible reserves of adult stem cells. These cells are known to have an effect on the regeneration and tissue repair and on cellular aging; this could be another positive action performed by PDRN in the pathogenesis.

### CONCLUSION

Despite many therapeutic approaches proposed over the years, the definitive treatment of AA is still being codified. We maintain that a valid therapeutic proposal is not confined to a drug, but to a therapeutic set and to a proper therapeutic approach, based on the type and the severity degree of the disease. In this context, through this preliminary study, and for the first time in this dermatological disease (recent dermatological studies that compare an infiltrative therapy with PDRN are interested Lichen sclerosus) [5,6] we have highlighted the efficacy, tolerability, and safety profile demonstrated by PDRN in association with Triamcinolone acetonide, which could be cited, (if further studies confirm these early data) as one of the effective adjuvant therapies in the management of AA, even reducing the quote of steroid percentage.

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