

## **Rhinolight® Phototherapy (for the treatment of allergic rhinitis symptoms)**

Rhinolight® is a phototherapy treatment of the nasal mucosa suitable for patients who suffer from allergic rhinitis (hay fever). Rhinolight® treatment reduces the body's immune response to inhaled allergens (such as pollens, moulds, animal dander and mites) and the symptoms of allergic rhinitis, by inhibiting the release of histamine from mast cells and inducing apoptosis of lymphocytes and eosinophils within the nasal cavity (Brehmer, 2010).

Rhinolight® is quick and easy. Treatment involves shining a special wavelength light source (5% UV-B, 25% UV-A plus 70% visible light) into each nasal cavity for 2-3 minutes at a time. Once deactivated, the ability of the mast cells to recognise and respond to inhaled allergens becomes impaired; hindering the release of the inflammatory markers (such as histamine) which are responsible for the symptoms of allergic rhinitis (Rhinolight Ltd., 2014).

The effectiveness and safety of Rhinolight® phototherapy has been investigated in numerous clinical trials worldwide. Rhinolight® is proven to significantly decrease the severity of common symptoms such as sneezing, runny nose, nasal itching and nasal blockage, for up to 12 months (Koreck et al., 2005). It is appropriate for use on children as young as 6 years of age, and is safe to perform during pregnancy and while women are breastfeeding. Rhinolight® is also recommended for athletes for whom the use of steroids is prohibited (Rhinolight Ltd.).

Rhinolight® is painless and associated with minimal side effects. There is no heat or burning felt by patients during treatments. Patients may experience a dry, crusty nose during the course of the treatments, however this is only temporary and can easily be remedied with the application of a vitamin A or E oil.

Rhinolight® phototherapy is indicated for chronic sufferers of seasonal or perennial allergic rhinitis who are unresponsive to, or inappropriate candidates for, conventional anti-allergic treatments. For patients with severe symptoms, Rhinolight® may be performed as a complimentary treatment, to enhance the effectiveness of pharmacotherapy or allergen immunotherapy (Rhinolight Ltd., 2014).

For the most effective relief of allergic rhinitis symptoms, patients are recommended to undergo eight Rhinolight® treatments within 6 weeks. Often patients report symptom improvement within the first few treatments. At the Australian Allergy Centre Rhinolight® is performed under the cover of Medicare, with no additional charges incurred by the patient.



### References:

- Brehmer, D. 2010. Endonasal phototherapy with Rhinolight® for the treatment of allergic rhinitis. *Expert Review of Medical Devices* 7, 1, 21-26.
- Koreck, A., Csoma, Z., Bodai, L., et al. 2005. Rhinophototherapy: A new therapeutic tool for the management of allergic rhinitis. *Journal of Allergy and Clinical Immunology* 115, 3, 541-547.
- Rhinolight Limited [Rhinolight Ltd.]. 2014. *Rhinolight-IV Phototherapeutic Device: User manual*. Szeged, Hungary: Author.

Keywords: hay fever treatment, secondary: hay fever cure

## **Latest Hay Fever Treatment, Rhinolight® , Provides Welcome Relief for the Springtime Sneezes**

*The Australian Allergy Centre is proud to announce a new hay fever treatment that will bring welcome relief to those suffering from seasonal allergies.*

For most people, spring is a time for enjoying the outdoors after emerging from our long winter sleep. But for those of you who suffer from hay fever, it can be a painful time. Watery eyes, sneezing, and runny noses are some of the symptoms of hay fever that hold you back from enjoying what should be one of the best times of the year.

But there's some good news for those looking for a new hay fever cure. And that's Rhinolight®.

Rhinolight® is a phototherapy treatment of the nasal mucus suitable for patients who suffer from hay fever. Rhinolight® treatment reduces the body's immune response to inhaled allergens like pollens, moulds, animal skin, and mites, while

also reducing the symptoms of hay fever.

Treatment involves exposing the nasal cavities to light at a particular wavelength (5% UV-B, 25% UV-A plus 70% visible light) for 2-3 minutes at a time, which reduces the cells' ability to recognise and respond to inhaled allergens, and release histamine, which is responsible for the symptoms of allergic rhinitis (Rhinolight Ltd., 2014).

## **The Benefits of Rhinolight® as a Hay Fever Treatment (heading 2)**

According to clinical trials, there are several benefits to using Rhinolight® as a hay fever treatment.

1. Rhinolight® significantly decreases the severity of common symptoms such as sneezing, runny nose, nasal itching and nasal blockage, for up to 12 months. (Koreck et al., 2005)
2. It's appropriate for children as young as 6, pregnant or breastfeeding women, and athletes who are banned from using steroids. (Rhinolight Ltd.)
3. Rhinolight® is painless hay fever treatment with

minimal side effects. Patients won't feel heat or burning during treatments. The only side effect is a temporary dryness of the nose, which can be relieved with a little vitamin E oil.

4. Rhinolight® phototherapy is a good hay fever cure for chronic seasonal allergy sufferers who are unresponsive to conventional anti-allergic or hay fever treatment.
5. For patients with severe symptoms, Rhinolight® may be performed as a complimentary treatment, to enhance the effectiveness of medicines or allergen immunotherapy (Rhinolight Ltd., 2014).

For the most effective relief of hay fever symptoms, doctors recommend eight Rhinolight® treatments within six weeks. Patients often report symptom improvement within the first few treatments.

Thinking of giving Rhinolight® a try?

References:

Brehmer, D. 2010. Endonasal phototherapy with Rhinolight® for the treatment of allergic rhinitis.

Expert Review of Medical Devices 7, 1, 21-26.

Koreck, A., Csoma, Z., Bodai, L., et al. 2005.

Rhinophototherapy: A new therapeutic tool for the management of allergic rhinitis. *Journal of Allergy and Clinical Immunology* 115, 3, 541-547.

Rhinolight Limited [Rhinolight Ltd.]. 2014. Rhinolight-IV

Phototherapeutic Device: User manual. Szeged, Hungary:

Author: Sophie Davidson – Allergy RN

Rhinophototherapy: gimmick or an emerging treatment option for allergic rhinitis?

Leong SC. Rhinophototherapy: gimmick or an emerging treatment option for allergic rhinitis? *Rhinology*. 2011 Dec;49(5):499-506. doi: 10.4193/Rhino11.118.

#### Abstract

Photodynamic therapy has been used in treating immune-mediated dermatological conditions such as psoriasis and atopic dermatitis. There are emerging reports on the efficacy of intranasal phototherapy in allergic rhinitis. The aim of this review was to assess intranasal phototherapy in the treatment of allergic rhinitis, with particular emphasis on clinical efficacy, scientific basis and safety. A structured search of the U.S. National Library of Medicine (PubMed), the Cochrane Collaboration library, Google Scholar and ISI Web of Knowledge database was undertaken using MeSH terms `phototherapy` and `rhinitis.` Fourteen full-text articles were available for review. Three different phototherapy medical devices were assessed: (1) Bionase(TM), (2) Allergy Reliever SN206 and (3) Rhinolight(®). Light wavelength used in these devices ranged from red light to ultraviolet. Clinical use of intranasal phototherapy appears to be safe and well tolerated. Most studies demonstrated symptomatic improvement and quality of life scores. No improvement in objective measures of nasal airflow was demonstrated. Beneficial effects of phototherapy on

inflammatory markers remain equivocal. Phototherapy treatment results in DNA damage but does not appear to predispose to carcinogenesis. However, long-term prospective studies are required to verify this. The quality of published studies was variable and thus the current strength of recommending intranasal phototherapy is currently weak.

## Narrow-Band Red Light Phototherapy in Perennial Allergic Rhinitis and Nasal Polyposis

Ittai Neuman, Ittai Neuman, Yehuda Finkelstein. From the Department of Allergy and Asthma, Hasharon Hospital, Petah Tiqwa (IN); and the Department of Otolaryngology, Head and Neck Surgery, Meir Hospital, Sapir Medical Center, Kfar Saba (YF), and the Sackler School of Medicine, Tel-Aviv University; Israel

### Background

Allergic rhinitis and nasal polyposis are common nasal diseases, but the available treatment modalities have only limited success.

### Objective

To assess the therapeutic effect of low-energy narrow-band red light phototherapy on nasal clinical symptoms of allergic rhinitis and nasal polyposis.

### Methods

In a double-blind randomized prospective study, 50 patients with allergic rhinitis and 10 with nasal polyposis received intranasal illumination at 660 nm for 4.4 minutes three times a day for 14 days (total dose 6 joules per day). Twenty-nine rhinitic patients and one patient with polyposis received equivalent sham

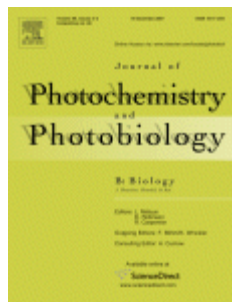
illumination as placebo. Evaluation was based on symptom scores and a clinical assessment that included pre-treatment and post-treatment videotaped rigid and flexible nasendoscopy.

### Results

Following treatment, improvement of symptoms was reported by 72% of the allergic rhinitis patients and objective improvement was endoscopically demonstrated in 70% of them as compared with 24% and 3%, respectively, in the placebo group. These differences were significant. No improvement was obtained in any of the patients with polyposis.

### Conclusions

Allergic rhinitis, if uncomplicated by polyps or chronic sinusitis, can be effectively treated by narrow-band red light illumination of the nasal mucosa at 660 nm, with marked alleviation of clinical symptoms. Whenever possible, candidates for phototherapy should be selected by endoscopic examination.



Effects of intranasal phototherapy on nasal mucosa in patients with allergic rhinitis.

A. Koreck A. Szechenyi<sup>d</sup>, et al. Effects of intranasal phototherapy on nasal mucosa in patients with allergic rhinitis. *Journal of Photochemistry and Photobiology B: Biology* Volume 89, Issues 2–3, 14 December 2007, Pages 163–169

## Abstract

### Rationale

Rhinophototherapy has been shown to be effective in the treatment of allergic rhinitis. Considering that phototherapy with ultraviolet light (UV) induces DNA damage, it is of outstanding importance to evaluate the damage and repair process in human nasal mucosa.

### Methods

We have investigated eight patients undergoing intranasal phototherapy using a modified Comet assay technique and by staining nasal cytology samples for cyclobutane pyrimidine dimers (CPDs), which are UV specific photoproducts.

### Results

Immediately after last treatment Comet assay of nasal cytology samples showed a significant increase in DNA damage compared to baseline. Ten days after the last irradiation a significant decrease in DNA damage was observed compared to data obtained immediately after finishing the treatment protocol. Difference between baseline and 10 days after last treatment was not statistically significant. Two months after ending therapy, DNA damage detected by Comet assay in patients treated with intranasal phototherapy was similar with that of healthy individuals. None of the samples collected before starting intranasal phototherapy stained positive for CPDs. In all samples collected immediately after last treatment strong positive staining for CPDs was detected. The number of positive cells significantly decreased 10 days after last treatment, but residual positive staining was present in all the examined samples. This finding is consistent with data reported in skin samples after UV irradiation. Cytology samples examined two months after ending therapy contained no CPD positive cells.

### Conclusion

Our results suggest that UV damage induced by intranasal phototherapy is efficiently repaired in nasal mucosa



## Rhinophototherapy: A new therapeutic tool for the management of allergic rhinitis.

Andrea I. Koreck, MD, PhD, Zsanett Csoma, MD et al. Rhinophototherapy: A new therapeutic tool for the management of allergic rhinitis *Journal of Allergy and Clinical Immunology*. Volume 115, Issue 3, March 2005, Pages 541–547



## Background

Phototherapy has a profound immunosuppressive effect and is able to inhibit hypersensitivity reactions in the skin.

## Objective

We evaluated whether phototherapy using a combination of UV-B (5%), UV-A (25%), and visible light (70%), referred to as mUV/VIS, is effective in treating allergic rhinitis.

## Methods

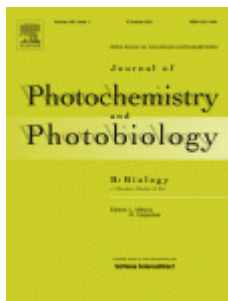
We conducted a randomized, double-blind study, in 49 patients with hay fever. The study was performed during the ragweed season. Each intranasal cavity was illuminated 3 times a week for 3 weeks with mUV/VIS or with low-intensity visible light. Symptom scores, inflammatory cells, and their mediators were assessed in nasal lavages. *In vitro* effects of mUV/VIS irradiation on T-cell and eosinophil apoptosis and its inhibitory effect on mediator release from basophils were examined.

## Results

Rhinophototherapy was tolerated well and resulted in a significant improvement of clinical symptoms for sneezing ( $P < .016$ ), rhinorrhea ( $P < .007$ ), nasal itching ( $P < .014$ ), and total nasal score ( $P < .004$ ). None of the scores improved significantly in the control group. Scores for nasal obstruction slightly improved after mUV/VIS treatment and significantly increased in the control group ( $P < .017$ ). In the nasal lavage, phototherapy significantly reduced the number of eosinophils and the level of eosinophil cationic protein and IL-5. *In vitro* irradiation of T cells and eosinophils with mUV/VIS light dose-dependently induced apoptosis. Furthermore, mUV/VIS irradiation inhibited the mediator release from RBL-2H3 basophils.

## Conclusion

These results suggest that phototherapy is an effective modality to treat allergic rhinitis and offer new options for the treatment of immune-mediated mucosal diseases.



## Histopathological evaluation of the effect of intranasal phototherapy on nasal mucosa in rabbits

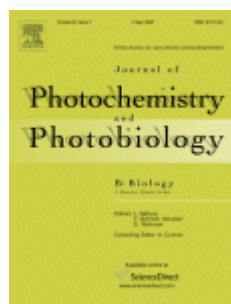
Tayfun Apuhan, Elçin Hakan Terzi, Aysel Kükner, Üzeyir Gök Histopathological evaluation of the effect of intranasal phototherapy on nasal mucosa in rabbits Journal of

### Abstract

Allergic rhinitis is a high-incidence allergic inflammation of the nasal airways that impacts quality of life. Of the numerous therapies used to treat allergic rhinitis, intranasal phototherapy has emerged as a promising new treatment modality for inflammatory airway disease. Phototherapy is widely used for the treatment of immune-mediated skin diseases because its profound immunosuppressive effect inhibits hypersensitivity reactions in the skin. Intranasal phototherapy using a combination of Ultraviolet-A (UVA) and Ultraviolet-B (UVB) plus Visible light (VIS) has been shown to suppress the clinical symptoms of allergic rhinitis, but limited data regarding its adverse effects on the nasal mucosa currently exists. In this study, we demonstrate that UV displays no harmful effects on the nasal mucosa cells of rabbits following 2 weeks of intranasal phototherapy.

### Highlights

Intranasal phototherapy has been shown to suppress the symptoms of allergic rhinitis. The effect of intranasal phototherapy on the nasal mucosa of rabbits was assessed. A pathological change was not evident in the rabbit nasal mucosa or concha epithelium cells of the rabbit.

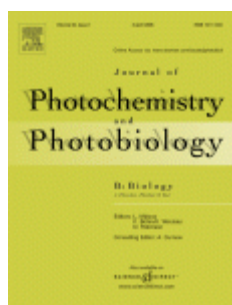


## Review: Ultraviolet light phototherapy for allergic rhinitis.

Lajos Kemény, Andrea Koreck: Review: Ultraviolet light phototherapy for allergic rhinitis *Journal of Photochemistry and Photobiology B: Biology*. Volume 87, Issue 1, 2 April 2007, Pages 58–65

### Abstract

Phototherapy has a profound immunosuppressive effect and is widely used for the treatment of immune mediated skin diseases. Phototherapy is able to inhibit immediate type hypersensitivity reaction in the skin. Intranasal phototherapy is a new approach for treatment of allergic rhinitis. In two open studies, 308 nm excimer laser and topical PUVA therapy efficiently inhibited clinical symptoms of allergic rhinitis. In a randomized, double-blind study combined low dose UVB, low dose UVA and visible light proved to be effective in reducing symptom scores for sneezing, rhinorrhea, nasal itching and the total nasal score in ragweed allergic patients. Mechanism of action of phototherapy is complex, it reduces the antigen presenting capacity of dendritic cells, induces apoptosis of immune cells and inhibits synthesis and release of pro-inflammatory mediator from several cell types. Therefore, intranasal phototherapy may represent an alternative treatment of allergic rhinitis and other inflammatory and immune mediated mucosal diseases.

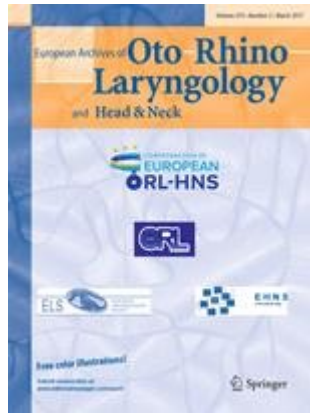


PUVA treatment of the nasal cavity improves the clinical symptoms of allergic rhinitis and inhibits the immediate-type hypersensitivity reaction in the skin.

Zsanett Csoma, Andrea Koreck et al. PUVA treatment of the nasal cavity improves the clinical symptoms of allergic rhinitis and inhibits the immediate-type hypersensitivity reaction in the skin *Journal of Photochemistry and Photobiology B: Biology*. Volume 83, Issue 1, 3 April 2006, Pages 21–26

#### Abstract

We earlier reported that intranasal irradiation with the 308 nm xenon chloride (XeCl) ultraviolet-B laser and irradiation with a combination of ultraviolet-B (UVB), ultraviolet-A (UVA) and visible light (VIS) is highly effective in the treatment of allergic rhinitis and inhibit the immediate-type hypersensitivity reaction in the skin. Since photochemotherapy with 8-methoxypsoralen (8-MOP) plus UVA light (PUVA) is widely used in the treatment of different inflammatory skin disorders due to its immunosuppressive effect, in the present study we investigated the efficacy of intranasal PUVA treatment in allergic rhinitis and the effect of PUVA treatment on the skin prick test (SPT) reaction. An open study was performed in 17 patients with hay fever. Intranasal PUVA therapy was given four times weekly for 3 weeks. The treatment was started with a fluence of 0.5× of the individual minimal phototoxic dose (MPD) and the dosages were gradually increased. Evaluation was based on the symptom scores. The effect of PUVA treatment on the allergen-induced wheal formation was also studied in the SPT. PUVA treatment of the nasal cavity significantly decreased the nasal symptoms of the patients with allergic rhinitis. Treatment of the skin with PUVA also significantly suppressed the allergen-induced wheal formation in the SPT reaction. These data suggest that intranasal PUVA phototherapy is also an effective modality in the treatment of allergic rhinitis.

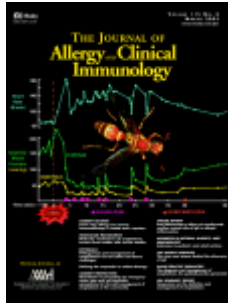


## Rhinophototherapy in persistent allergic rhinitis.

Zsolt Bella. Ágnes Kiricsi. Éva Dósa-Rácz Viharosné et al. Rhinophototherapy in persistent allergic rhinitis. *European Archives of Oto-Rhino-Laryngology* March 2017, Volume 274, Issue 3, pp 1543–1550

### Abstract

Previous published results have revealed that Rhinolight® intranasal phototherapy is safe and effective in intermittent allergic rhinitis. The present objective was to assess whether phototherapy is also safe and effective in persistent allergic rhinitis. Thirty-four patients with persistent allergic rhinitis were randomized into two groups; twenty-five subjects completed the study. The Rhinolight® group was treated with a combination of UV-B, UV-A, and high-intensity visible light, while the placebo group received low-intensity visible white light intranasal phototherapy on a total of 13 occasions in 6 weeks. The assessment was based on the diary of symptoms, nasal inspiratory peak flow, quantitative smell threshold, mucociliary transport function, and ICAM-1 expression of the epithelial cells. All nasal symptom scores and nasal inspiratory peak flow measurements improved significantly in the Rhinolight® group relative to the placebo group and this finding persisted after 4 weeks of follow-up. The smell and mucociliary functions did not change significantly in either group. The number of ICAM-1 positive cells decreased non-significantly in the Rhinolight® group. No severe side-effects were reported during the treatment period. These results suggest that Rhinolight® treatment is safe and effective in persistent allergic rhinitis.



## Rhinophototherapy: A new therapeutic tool for the management of allergic rhinitis.

Andrea I. Koreck, Zsanett Csoma, Laszlo Bodai, Ferenc Ignacz et al.

Rhinophototherapy: A new therapeutic tool for the management of allergic rhinitis. *Allergy and Clinical Immunology*.

### Background

Phototherapy has a profound immunosuppressive effect and is able to inhibit hypersensitivity reactions in the skin.

### Objective

We evaluated whether phototherapy using a combination of UV-B (5%), UV-A (25%), and visible light (70%), referred to as mUV/VIS, is effective in treating allergic rhinitis.

### Methods

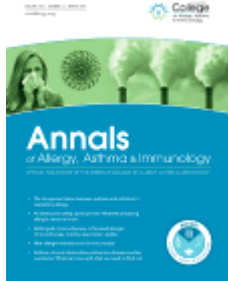
We conducted a randomized, double-blind study, in 49 patients with hay fever. The study was performed during the ragweed season. Each intranasal cavity was illuminated 3 times a week for 3 weeks with mUV/VIS or with low-intensity visible light. Symptom scores, inflammatory cells, and their mediators were assessed in nasal lavages. *In vitro* effects of mUV/VIS irradiation on T-cell and eosinophil apoptosis and its inhibitory effect on mediator release from basophils were examined.

### Results

Rhinophototherapy was tolerated well and resulted in a significant improvement of clinical symptoms for sneezing ( $P < .016$ ), rhinorrhea ( $P < .007$ ), nasal itching ( $P < .014$ ), and total nasal score ( $P < .004$ ). None of the scores improved significantly in the control group. Scores for nasal obstruction slightly improved after mUV/VIS treatment and significantly increased in the control group ( $P < .017$ ). In the nasal lavage, phototherapy significantly reduced the number of eosinophils and the level of eosinophil cationic protein and IL-5. *In vitro* irradiation of T cells and eosinophils with mUV/VIS light dose-dependently induced apoptosis. Furthermore, mUV/VIS irradiation inhibited the mediator release from RBL-2H3 basophils.

## Conclusion

These results suggest that phototherapy is an effective modality to treat allergic rhinitis and offer new options for the treatment of immune-mediated mucosal diseases.



## Narrow-Band Red Light Phototherapy in Perennial Allergic Rhinitis and Nasal Polyposis

Ittai Neuman. eYehuda Finkelstein From the Department of Allergy and Asthma, Hasharon Hospital, Petah Tiqwa (IN); and the Department of Otolaryngology, Head and Neck Surgery, Meir Hospital, Sapir Medical Center, Kfar Saba (YF), and the Sackler School of Medicine, Tel-Aviv University; Israel. Narrow-Band Red Light Phototherapy in Perennial Allergic Rhinitis and Nasal Polyposis. Annals of Allergy, Asthma & Immunology. Volume 78, Issue 4, April 1997, Pages 399-406

### Background

Allergic rhinitis and nasal polyposis are common nasal diseases, but the available treatment modalities have only limited success.

### Objective

To assess the therapeutic effect of low-energy narrow-band red light phototherapy on nasal clinical symptoms of allergic rhinitis and nasal polyposis.

### Methods

In a double-blind randomized prospective study, 50 patients with allergic rhinitis and 10 with nasal polyposis received intranasal illumination at 660 nm for 4.4 minutes three times a day for 14 days (total dose 6 joules per day). Twenty-nine rhinitic patients and one patient with polyposis received equivalent sham illumination as placebo. Evaluation was based on symptom scores and a clinical assessment that included pre-treatment and post-treatment videotaped rigid and flexible nasendoscopy.

### Results

Following treatment, improvement of symptoms was reported by 72% of the allergic rhinitis patients and objective improvement was endoscopically demonstrated in

70% of them as compared with 24% and 3%, respectively, in the placebo group. These differences were significant. No improvement was obtained in any of the patients with polyposis.

### Conclusions

Allergic rhinitis, if uncomplicated by polyps or chronic sinusitis, can be effectively treated by narrow-band red light illumination of the nasal mucosa at 660 nm, with marked alleviation of clinical symptoms. Whenever possible, candidates for phototherapy should be selected by endoscopic examination.