

# New and Experimental Skin- directed therapies with 308 light

Uwe Paasch, M.D., Ph.D.

Professor Division of Lasers and Aesthetics

Department of Dermatology

University of Leipzig

Germany

*18<sup>th</sup> Congress of the EADV*

*Berlin, Germany, October 8<sup>th</sup> 2009*

# Efficacy of 308 nm

Narrow band UVB is widely used in treatment of skin diseases

308 nm Xenon chloride UVB laser light is more effective in treating psoriasis and in inducing T cell apoptosis than narrow-band ultraviolet B

- Lancet 350:1522
- J Photochem Photobiol B 67:32–38
- Photochem Photobiol 79:434–439

Localized, mild therapy-resistant atopic dermatitis

Lichen simplex chronicus Vidal

Cutaneous Lymphoma

Nodular prurigo

Alopecia areata

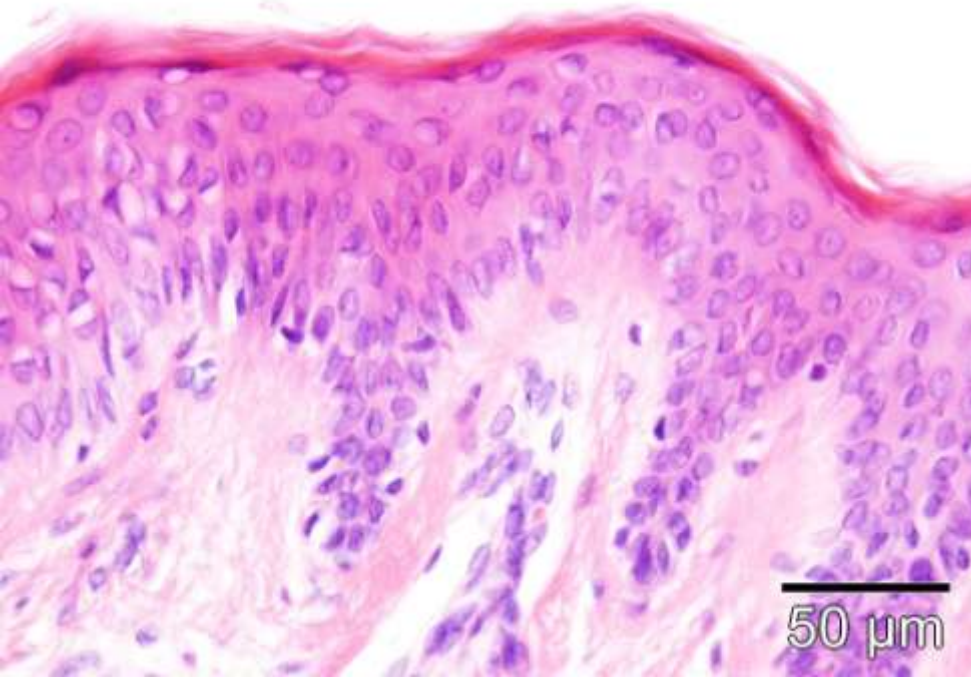
Lichen ruber planus

Granuloma anulare

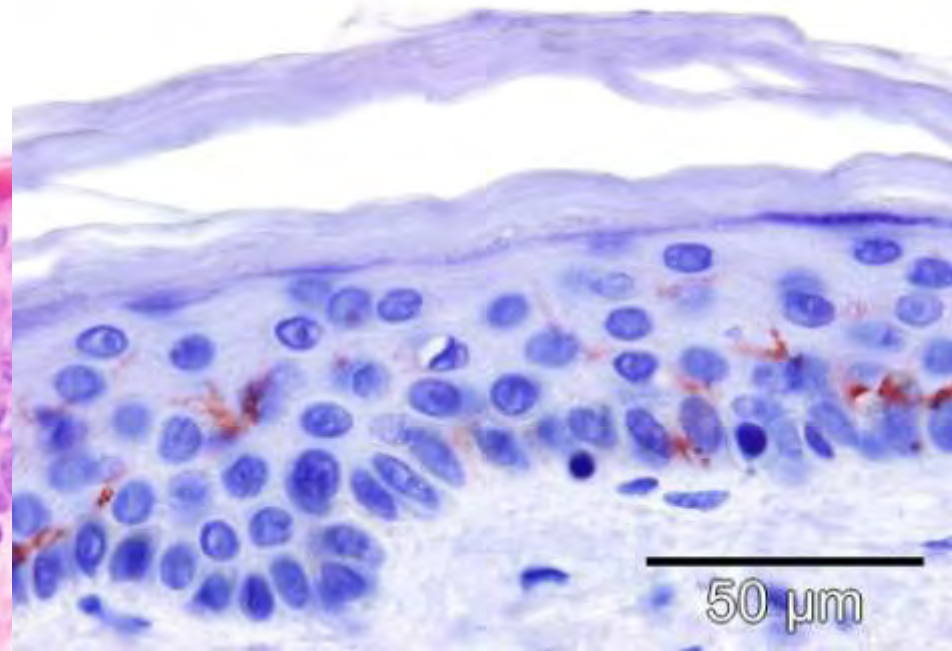
Lichen sclerosus et atrophicans

Ictus reaction

# Epidermal compartment

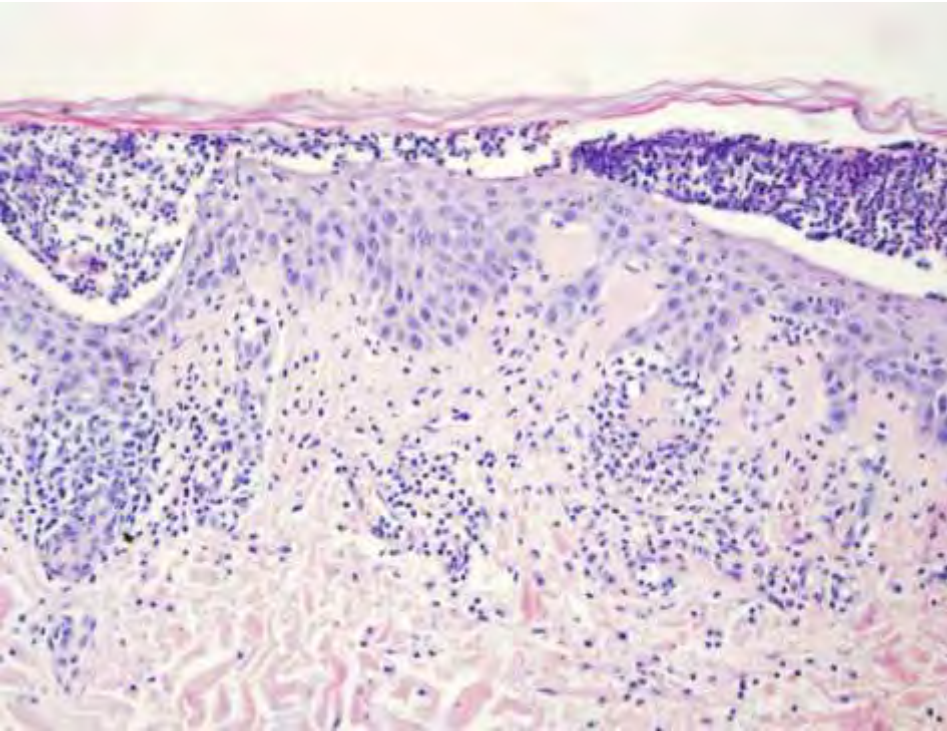


HE 60x

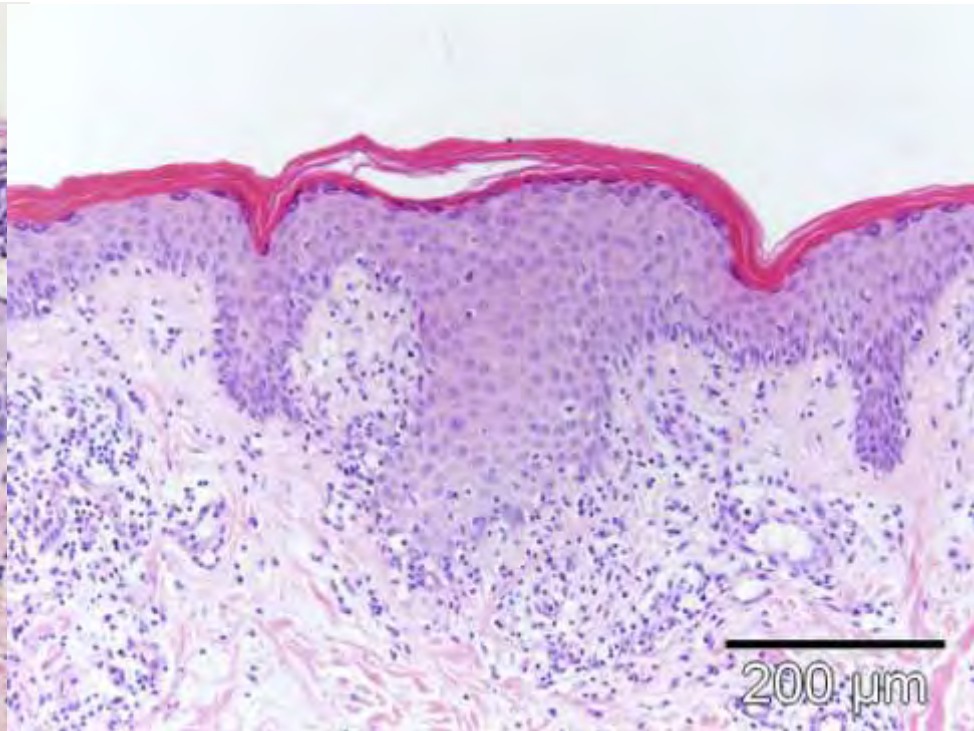


S100/Haemalaun, 100x

# Epidermal inflammation



Pustular dermatitis



Interface dermatitis

# 308 nm excimer laser and excimer system light



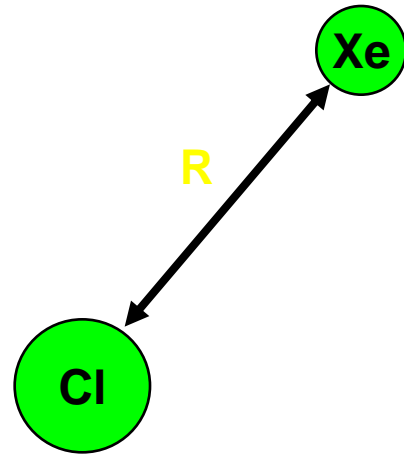
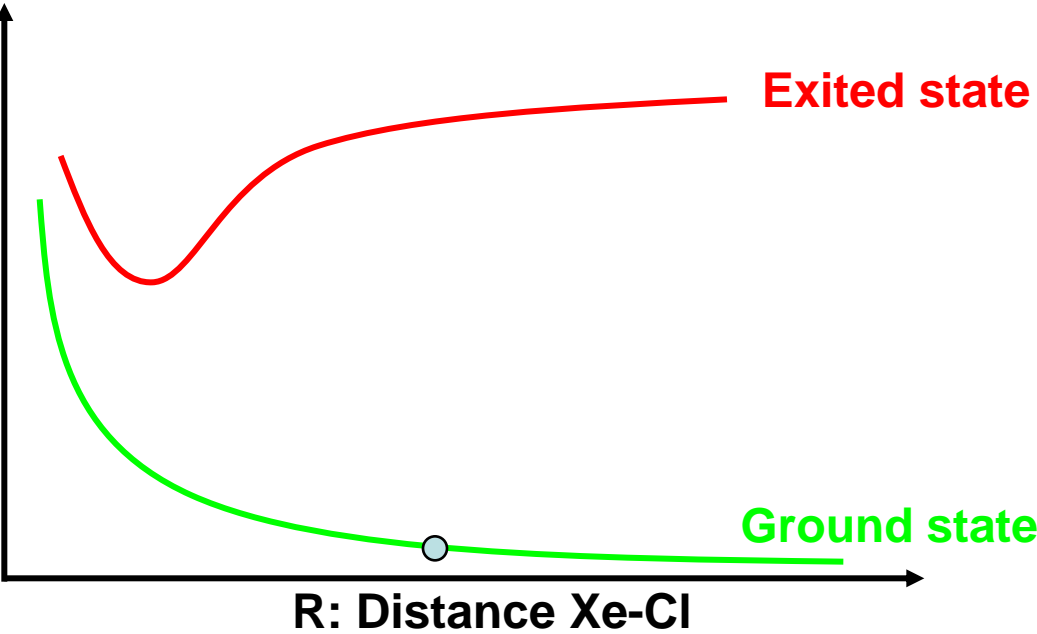
Excimer laser



Excimer system

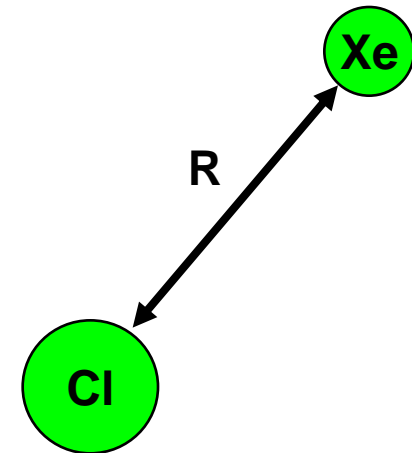
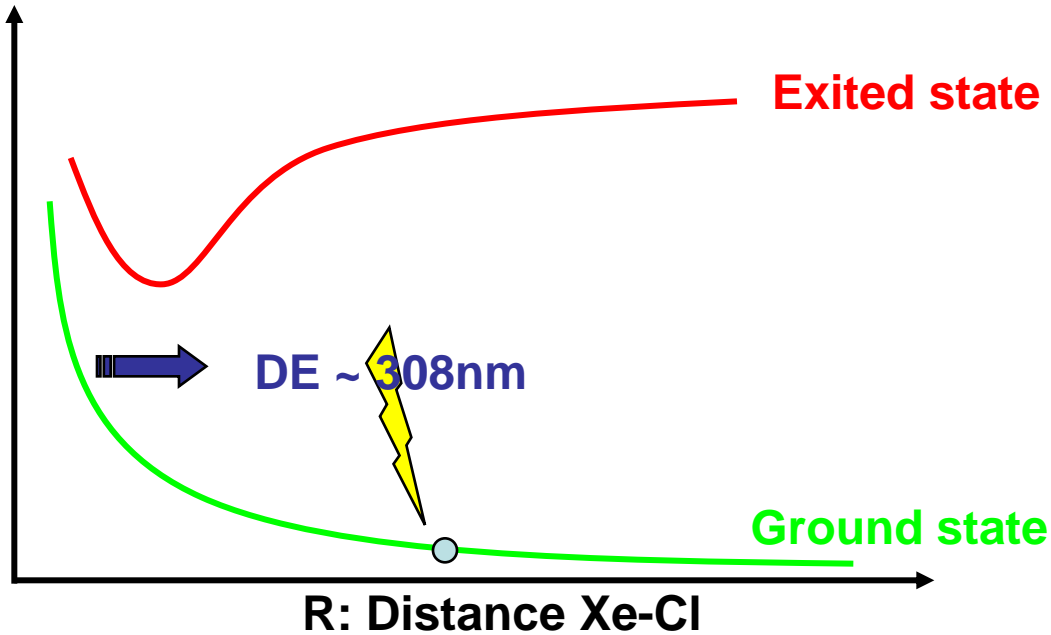
# An excimer is an... ..excited dimer

E: Energy  
Xe-Cl

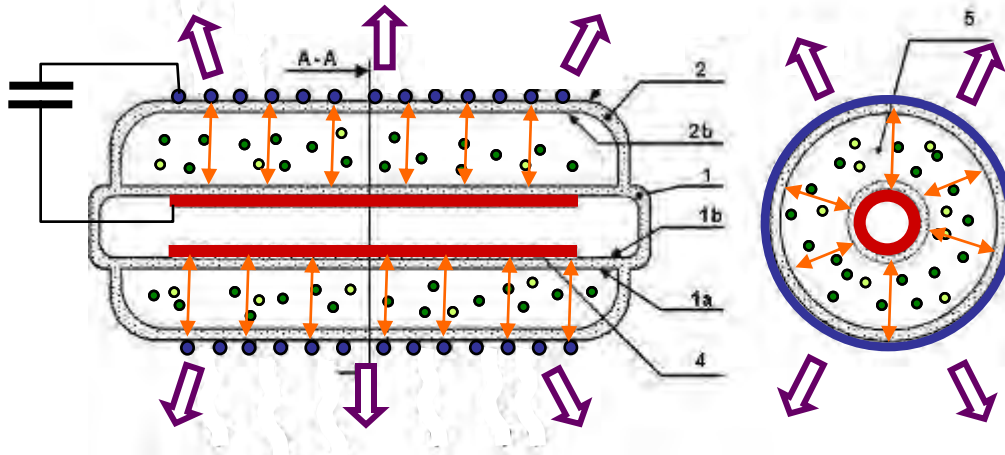


# The excimer cycle

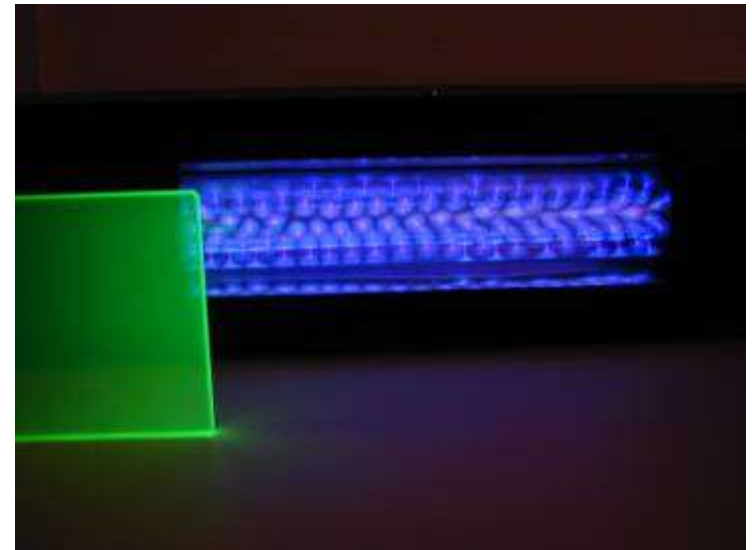
E: Energy  
Xe-Cl



# What is an excimer lamp?



- HV electrode
- Ground electrode
- Xe & Cl molecules
- ↔ Electrical discharge
- ⇨ Photons at 308nm



Is there a higher efficacy of combination therapy?

## Psorex-Study

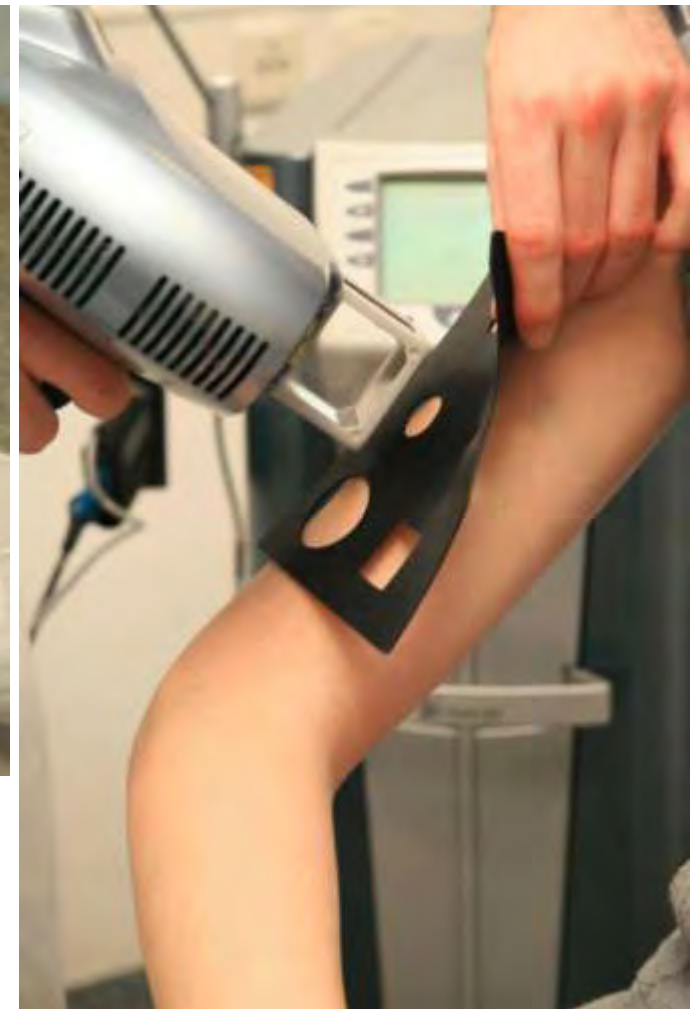
- Treatment of plaque-type psoriasis with
  - Dithranol or vitamin D analoga alone or
  - In combination with 308 nm excimer laser
    - Twice weekly at a dose of 3 MED
    - Further dose adjusted depending on response
- To evaluate the
  - Response until clearing-up or up to a maximum of 10 treatments
    - Defined as PASI 75
      - » a 75 % improvement in PASI score
  - Relapse rates until 6 months follow up

# MED Test and Treatment



## MED definition

lowest fluence that generate a smooth redness  
48 hrs after exposure



Therapy: 2 x MED

## Efficacy

- Rating scales on the five point PASI score
  - Erythema
  - Induration
  - Scaling each
- Total Sign Score
  - defined as the sum of these measurements

## Safety

- Adverse events, physical examination, local tolerability, blood pressure, pulse rate, haematology, blood biochemistry and urinalysis

# Study hypothesis

## Primary endpoint

$H_0$ : Laser + Dithranol / Vit D3 = Dithranol / Vit D3

$H_1$ : Laser + Dithranol / Vit D3  $\neq$  Dithranol / Vit D3

## Secondary endpoint

$H_0$ : Laser + Calcipotriol = Laser + Dithranol

$H_1$ : Laser + Calcipotriol  $\neq$  Laser + Dithranol

## Study population

- $\sum n = 61$ ,  $n = 38$   $n = 16$
- Age Mean 45.6 +/- 10.7 yrs
- Follow up 6 month
- 5 dropouts

# Wilcoxon-Rangsum test

	C vs. C+L		D vs. D+L		C+L vs. D+L	
	Prim endpoint	Score reduction	Prim endpoint	Score reduction	Prim endpoint	Score reduction
V16	<b>p=0</b>	<b>p=0</b>	<b>p=0</b>	<b>p=0</b>	P > 0.05	P > 0.05
V17	<b>p=0</b>	<b>p=0</b>	p=0,0001	p=0,0002	P > 0.05	P > 0.05
V18	p=0,0025	p=0,0034	p=0,0004	p=0,0012	P > 0.05	P > 0.05

Null hypothesis needs to be rejected  
 Combination of laser with either Dithranol or  
 Vit D3 is superior

Null hypothesis accepted

# Conclusion

## Primary endpoint

~~$H_0$ : Laser + Dithranol / Vit D3 = Dithranol / Vit D3~~

$H_1$ : Laser + Dithranol / Vit D3  $\neq$  Dithranol / Vit D3

- 50% mean reduction in PASI score
- Relapse free intervall
  - until 6 months post combined therapy

## Secondary endpoint

$H_0$ : Laser + Calcipotriol = Laser + Dithranol

~~$H_1$ : Laser + Calcipotriol  $\neq$  Laser + Dithranol~~

Rogalski et al in preparation

# Psoriasis

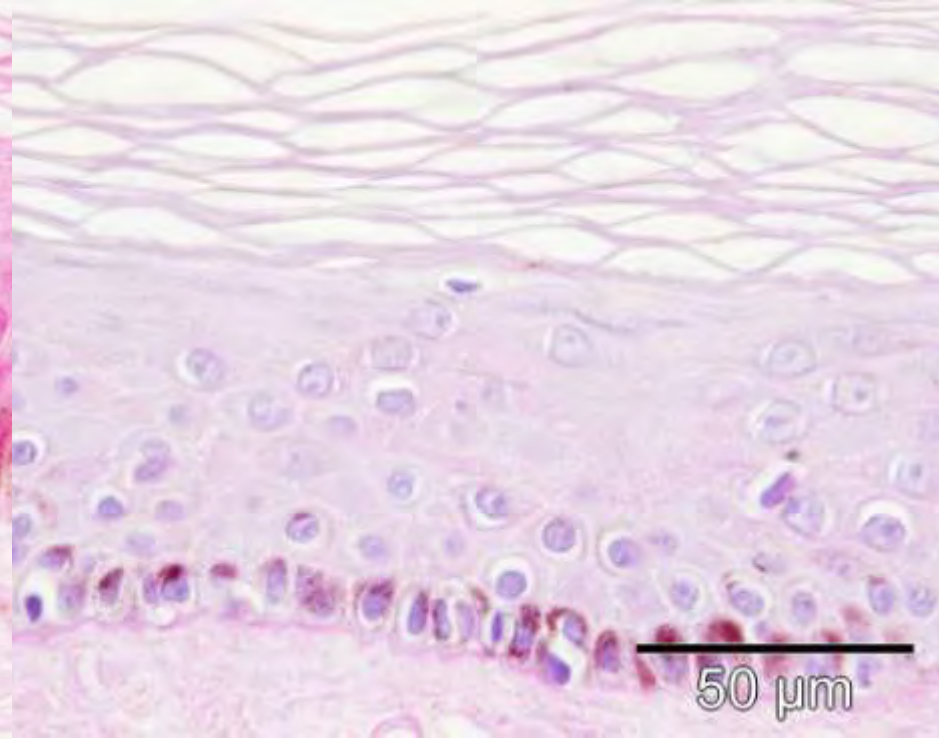
Psorex-Study: 10Tx



# 308 in Vitiligo: Epidermal pigmentation system



Masson-Fontana 100x



PAS 100x

# 308 in Vitiligo: Epidermal pigmentation system



Optimal weekly frequency

- Fast repigmentation 3x weekly
- Ultimate repigmentation depends on number of Tx: e.g. 12 or more weeks needed
  - BJD 152:981

Prediction difficult

- Dermatology Online June 2009

# 308 in vitiligo : 15Tx 2 times a week



# 308 in vitiligo: combination approach

308 nm in monotherapy and combined with topical khellin 4%

- Furanochromone (dimethoxy-4, 9 methyl-7 oxo-5 5-H-Furo [3,2-G]-4H chromone)
- Vasodilative properties
- Stimulates melanocyte proliferation
- chemical structure closely resembles that of psoralen

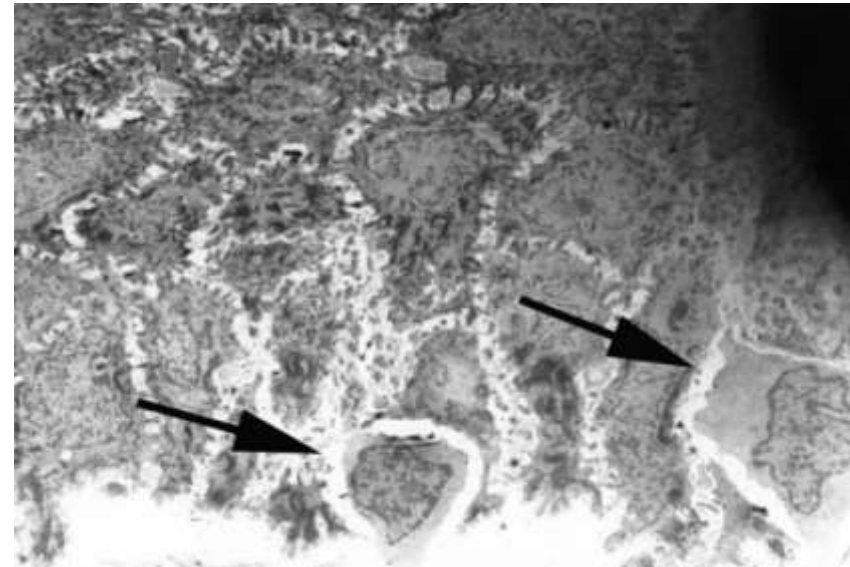
Effective on Asian skin

- Acta Dermatovenerol Alp Panonica Adriat. 18:13-9

Leukoderma in striae distensae

- Dermatol Surg 31:385

Electron microscopy 6 months after treatment showing an increase in the number and size of melanocytes.



# Cutaneous lymphoma: Mycosis fungoides

308 nm is effective in early stage Mycosis fungoides

- Br J Dermatol 151:877
- Ann Dermatol Vénéréol 134:225
- Photodermatol Photoimmunol Photomed 22:168

Patch or plaque-stage primary CL

- 50 mJ/cm<sup>2</sup> initial fluences
  - increased by 100 mJ/cm<sup>2</sup> every 2 sessions
  - twice weekly
- Complete remission in 80%
- Clinical healing was obtained in 11–21 tx
- Cumulative dose ranging from 2.4 to 16.1 J/cm<sup>2</sup>
- No clinical recurrence was noted 3 months after the end of TX
  - Arch Dermatol 140:1291

# 308 in cutaneous lymphoma: mycosis fungoides



Complete remissio in 80%

# Lymphomatoid papulosis and CD30<sup>+</sup> lymphoma

308 nm is effective in CD30<sup>+</sup> cutaneous lymphoproliferative disorders

- J Drugs Dermatol 6:440

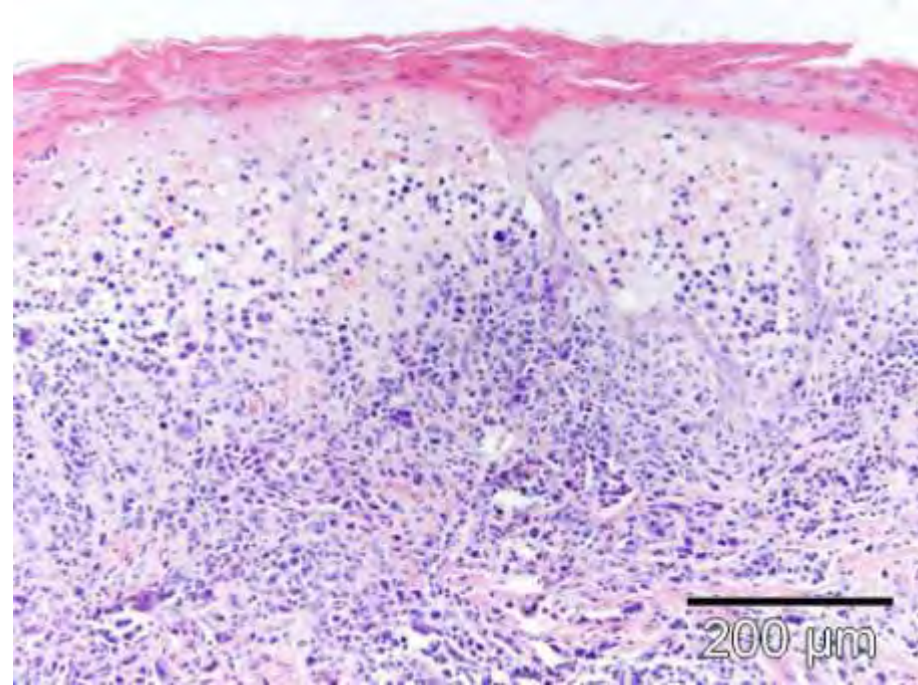
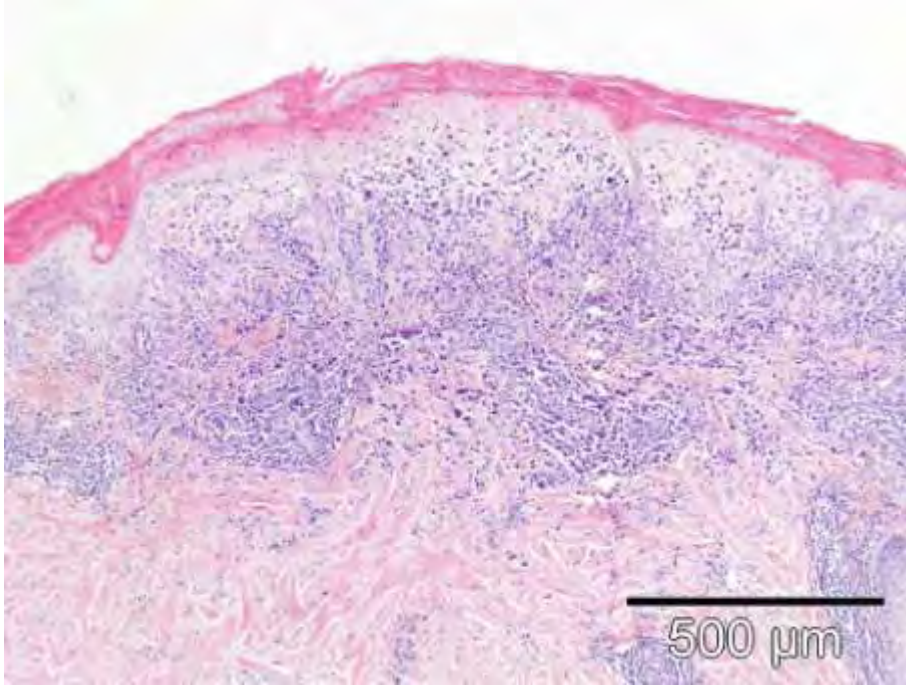
Side effects noticed and manageable in all patients

- Usually slight erythema
- Pruritic sensation
- Transient hyperpigmentation
- In the case of side effect
  - Sessions to be cancelled
  - The fluence at the next treatment is to be set to the highest tolerated dose
    - Skin Pharmacol Physiol 22:322

# Lymphomatoid papulosis



# Lymphomatoid papulosis



Complete remission after 10Tx described  
Penetration depth might be the limiting factor

# Marginal zone lymphoma



♂ 17 yrs.

# 308 nm light in treatment of inflammatory diseases

## Localized, mild therapy-resistant atopic dermatitis

- 10 treatments during 6-8 weeks
- Significant reduction in pruritus after 3-4 Tx
- complete remission ~ 85%

## Lichen simplex chronicus Vidal

## Lichen ruber planus

- Hautarzt August 2009 Epub
- Photomed Laser Surg 27:647-54

## Nodular prurigo

## Alopezia areata

## Lichen sclerosus et atrophicans

## Granuloma anulare

## Ictus reaction

# Atopic eczema

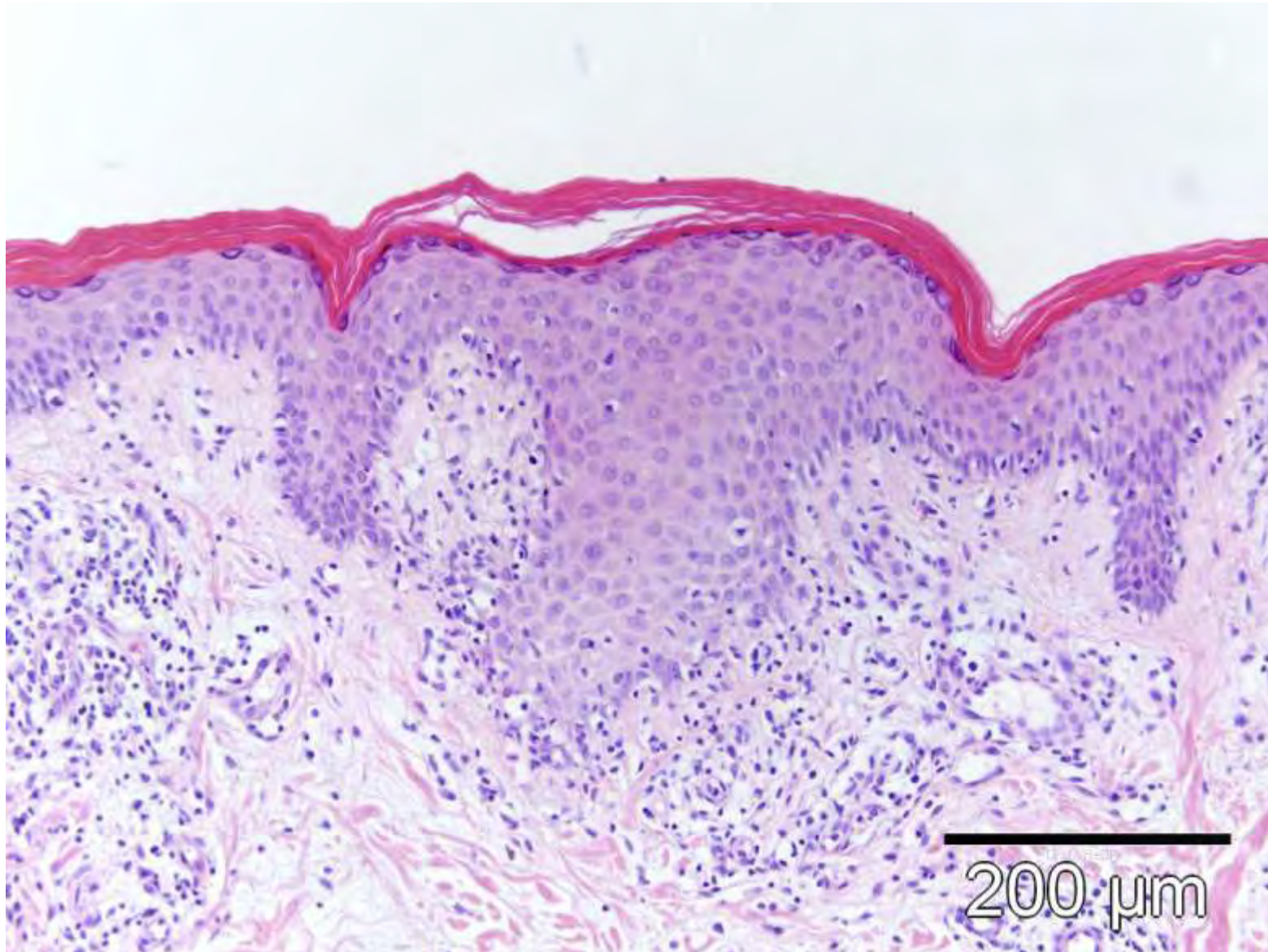


The ideal patients suffers from localized areas

# Insect bites



# Insect bites



# Conclusion

---

## Effective device for

- Psoriasis
- Vitiligo
- Cutaneous lymphoma

## Side effects observed

- Erythema, crusts

## Excellent

- Remission rates
- Easy to be tolerated by the patients

## 308 nm therapy helpful in many localized inflammatory diseases

- Studies needed
- Studies needed
- Studies needed

**Thank  
you.**

