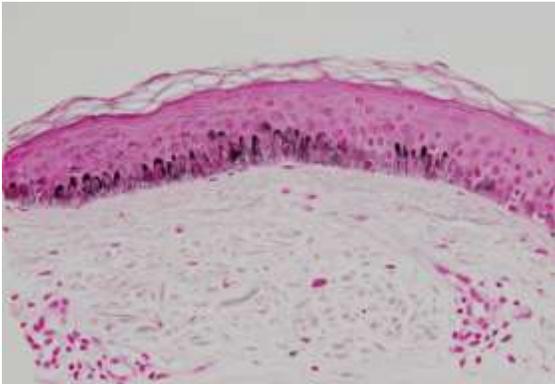


## Melasma Treatment Protocol November 2011

### Review of the findings of En Hyung Kim et al & BJ Kim et al

The treatment of melasma has been problematic often producing only short term results. En Hyung Kim et al have reported insights into the nature of melasma<sup>1</sup>. In particular they found that the melanotic signs of melasma resulted from an underlying increase in vascularity. Further recent studies by Beom Joon Kim et al have shown that expression of Vascular Endothelial Growth Factor (VEGF) in keratinocytes decreased after treatment with Dual Yellow laser therefore having a direct effect on melanogenesis<sup>2</sup>.

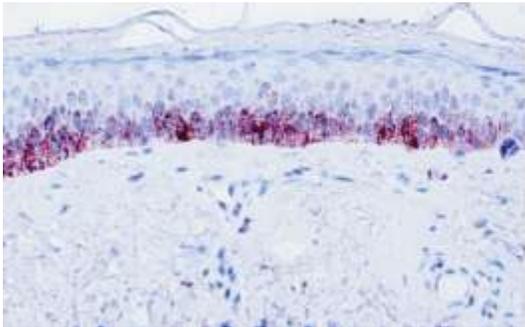


Fontana-Masson Stained x400

The Pigment in melasma is located as “caps” overlying keratinocyte nuclei.

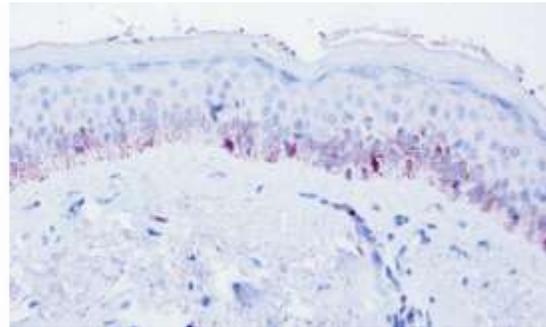
This melanin can mask the underlying vascularity and make laser treatment more difficult.

In addition Kim et al found that the production of melanin by keratinocytes was influenced by the presence of increased Vascular Endothelial Growth Factor (VEGF) in the region of the melanocytes as shown below.



Increased expression of VEGF  
In a melasma lesion

Immunostaining with antibody to VEGF (x400)

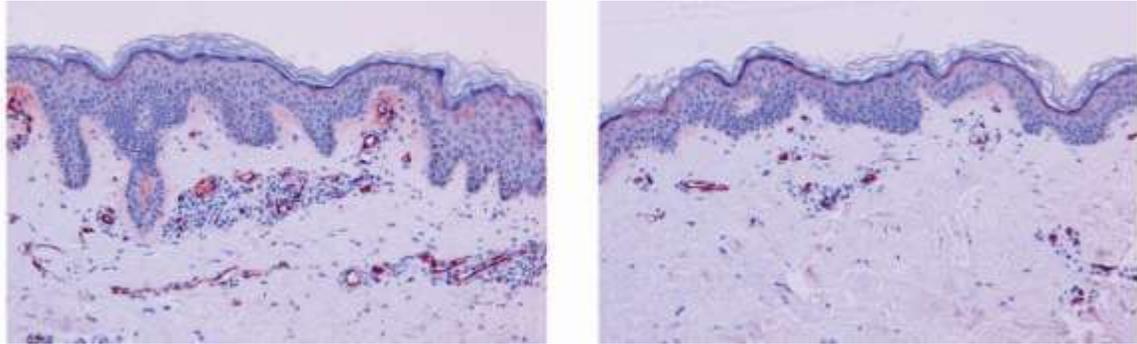


Adjacent normal skin showing  
lower VEGF

<sup>1</sup> Kim E H, Kim Y C, Lee ES, Kang H Y. The vascular characteristics of melasma. J of derm science 2007;46:111-6

<sup>2</sup> Kim B J, Lee H I, Lim Y Y, Kim M N, Min H J, Hwang J H, Song K Y. Clinicopathologic Efficacy of Copper Bromide Laser (578nm and 511nm) for treatment of Melasma in Asian patients. Dermatol Surg 36:885 (2010)

They also examined the dermis and found an increased vessel count and density in lesional areas.



Lesional skin

adjacent normal skin

Factor VIIIa related antigen stained section show increased vascularity.

### **Treatment of Melasma.**

It appears from the investigation of Kim et al that the reduction of vascularity and VEGF will reduce the underlying cause of melasma however the overlying melanin surrounding the keratinocytes provides an absorber for light based treatment with Haemoglobin as the target. In fact the use some laser or IPL based systems may cause thermal damage to the melanin bearing structures leading to Post Inflammatory Hyperpigmentation (PIH) thus worsening the situation.

A Q-switched YAG laser used in “skin toning” mode has been shown to successfully breakup the melanin caps overlying the keratinocytes

Pulsed light at 578nm as produced by Copper Bromide lasers has been used to reduce the probability of PIH and indeed has been shown to reduce VEGF resulting from thermal and other damage.

A new treatment protocol has been developed which has been shown to be successful in the long term treatment of melasma, this protocol is based on the latest available evidence and optimally combines the use of both Q-switched YAG laser with the Dual Yellow Laser.

The YAG laser, if available can speed up the treatment process allowing the Yellow light from the Dual yellow to penetrate into the dermis to reduce the vascularity and VEGF. If no YAG laser is available then the Dual Yellow Laser can be used alone with one or two extra treatments, the Q-Switched laser can not however be used alone as PIH will most likely result.

## **Treatment protocol where only the Dual Yellow Laser is available.**

### **First visit**

1. PIH potential reduction:  
Use the Dual yellow Laser in yellow mode, 1mm spot size 20 J/cm<sup>2</sup>, cover with a thin layer of gel, use a rapid scanning motion to cover the entire region with about 10J for each cm<sup>2</sup> of lesion.
2. Pigment reduction:  
Use the Dual yellow Laser in Y10G (+plus) mode, 1mm spot size 20 J/cm<sup>2</sup>, cover with a thin layer of gel, use a rapid scanning motion to cover the entire region with about 10J for each cm<sup>2</sup> of lesion.
3. Vascular control:  
Change to the 0.6mm handpiece and use Yellow at 25 to 30J/cm<sup>2</sup> cover with 2-3 passes again with rapid scanning motion deliver about 10J per cm lesion area.

### **Second and subsequent visits.**

Use the same treatment protocol as used in the first treatment.

#### **Notes:**

Skin bleaching preparations such as tri-luma may be used prior to laser treatment to reduce the overlying pigment thus providing access to the target underlying vessels.

Four visits are normally required with a 2 week interval between treatment sessions.

It is advised that if necessary the Dual Yellow be upgraded to a colour screen which shows total dose delivered in Joules (this is in the top right side of the screen). Using the appropriate number of joules for each cm area of lesion ensures that an adequate dose is delivered.

## **Treatment protocol using both the Dual yellow and the Skin toning Q-switched lasers.**

### **First visit**

1. Breakup melanin:  
Use the 1064nm Q-switched laser 7mm spot size and 1.5 to 1.7J/cm<sup>2</sup>, 2 to 3 passes. Use your normal skin toning settings.
2. Erythema (PIH) control:  
Use the Dual yellow Laser in yellow mode, 1mm spot size 20 J/cm<sup>2</sup>, cover with a thin layer of gel, use a rapid scanning motion to cover the entire region with about 10J for each cm<sup>2</sup> of lesion.
3. Vascular control:  
Change to the 0.6mm handpiece and use Yellow at 25 to 30J/cm<sup>2</sup> cover with 2-3 passes again with rapid scanning motion.

### **Second and subsequent visits.**

If Aggravated pigmentation is seen then do **not** use skin toning, but use the 1mm handpiece as for erythema control in 2 above, this may be followed by Vascular control as above.

If a slight improvement is seen from the previous treatment then repeat the 3 steps as for the previous treatment.

If a significant improvement is seen from the previous treatment then repeat the previous treatment and include one extra treatment consisting of 3 passes using gel with the 1mm handpiece, Y10G mode at 15 J/cm<sup>2</sup>

Notes: The use of a Q-Switched YAG laser removes the need for skin bleaching (tri-luma or similar) however The Q-switched laser can cause PIH.

## **Treatment protocol for use on Fitzpatrick type IV and V skin using Dual Yellow laser.**

### First visit

1. PIH potential reduction:  
Use the Dual yellow Laser in yellow mode, 1mm spot size 8-10 J/cm<sup>2</sup>, cover with a thin layer of gel, use a rapid scanning motion to cover the entire region with about 10J for each cm<sup>2</sup> of lesion.
2. Pigment reduction:  
Use the Dual yellow Laser in Y10G (+plus) mode, 1mm spot size 8-10 J/cm<sup>2</sup>, cover with a thin layer of gel, use a rapid scanning motion to cover the entire region with about 10J for each cm<sup>2</sup> of lesion.
3. Vascular control:  
Change to the 0.6mm handpiece and use Yellow at 12-16 J/cm<sup>2</sup> cover with 2-3 passes again with rapid scanning motion deliver about 10J per cm lesion area.

### Second and subsequent visits.

Use the same treatment protocol as used in the first treatment.

### Notes:

Skin bleaching preparations such as tri-luma may be used prior to laser treatment to reduce the overlying pigment thus providing access to the target underlying vessels.

Up to 10 treatments may be required for type IV & V skin with a 2 week interval between treatment sessions.

### Acknowledgement:

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