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EU FP7 «*Light+Ter*» Project

REGIONE TOSCANA

EU FP7 and Tuscany Region ERANET+ *LightPatch*

Blue LED light irradiation induces wound healing improvements through modulation of the inflammatory infiltrate

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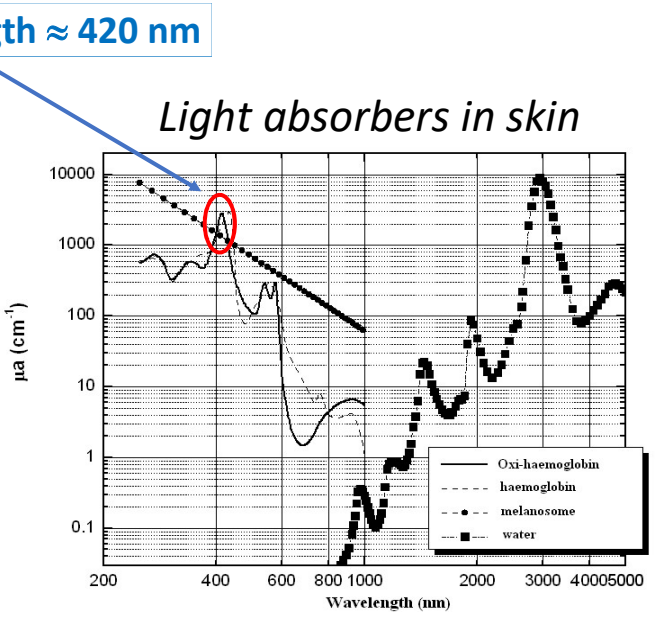
Introduction

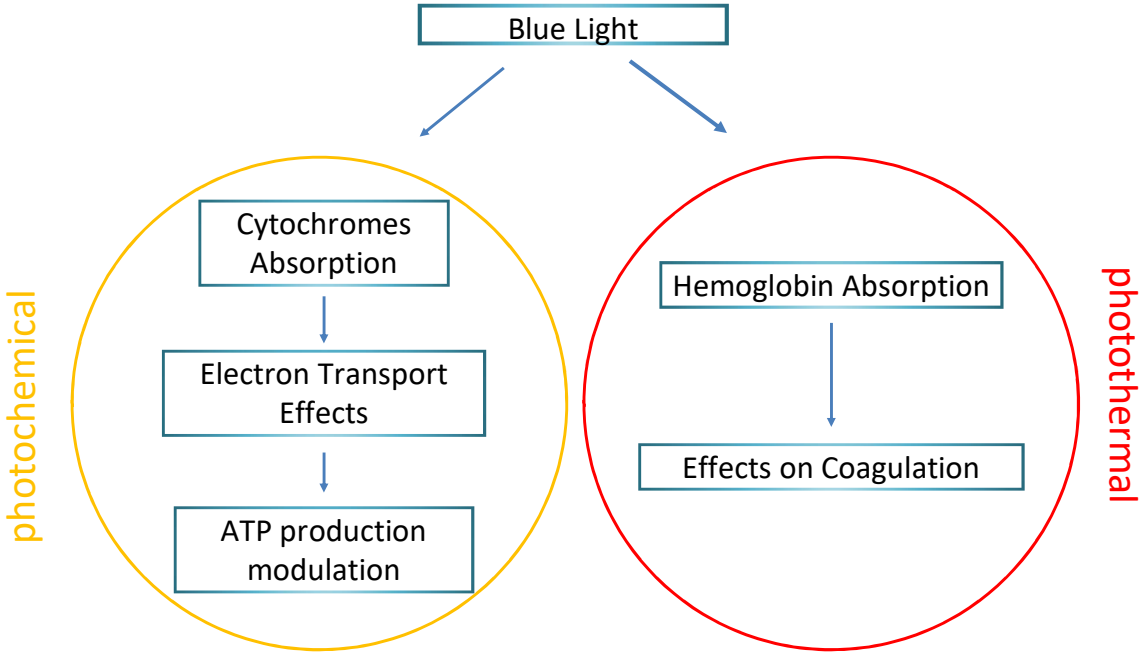
A problem to be solved:

To design a non-invasive, low cost, easy-to-use device for:

- inducing photohaemostasis of superficial bleeding
- promoting wound healing in difficult wounds



- ➢ *Take advantage of endogenous absorbers in blood such as oxy- (deoxy-) haemoglobin*
- ➢ *Maximize haemoglobin absorption against absorption of other absorbers (i.e melanin)*
- ➢ *Transform light energy into a thermal effect or photochemical effect*



In vivo tests

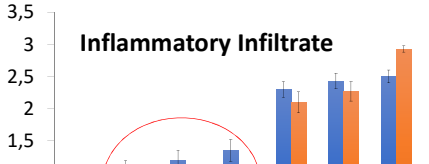
Analysis of the healing phase in mice models

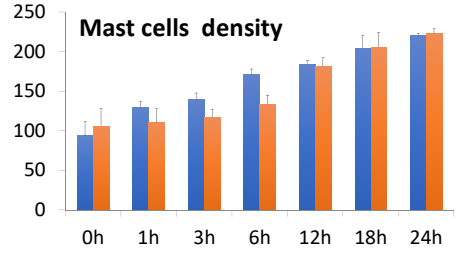
Materials & Methods

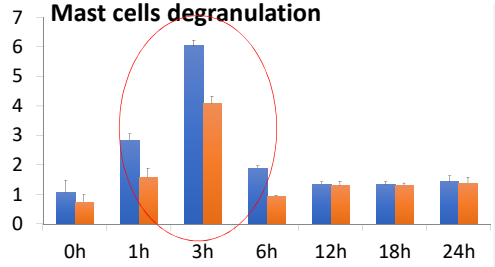
- 2 superficial abrasions on the back (∅ 1cm)
- Random treatment on one of the wound
- Follow up @0, 1, 3, 6, 12, 18 , 24, 72 h
- Macroscopic observation during follow up
- Histology, immunohistochemistry and confocal microscopies of biopsies

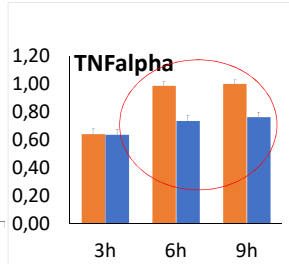
Results long term follow up

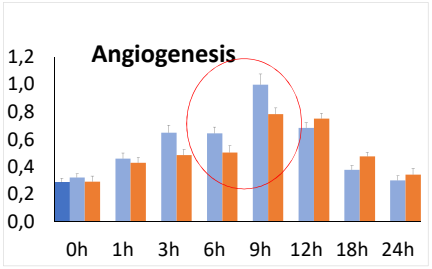
Tests were performed in albino and black mice, diabetic, coagulopatic and TRPV1 knock-out mice

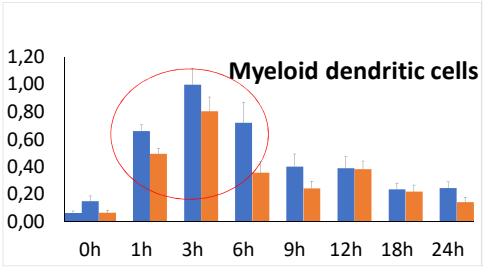


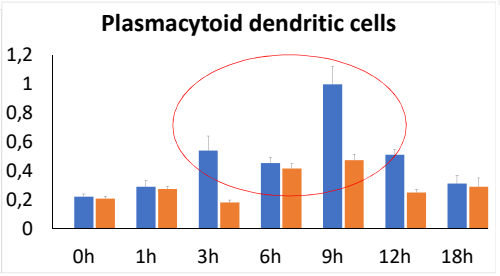


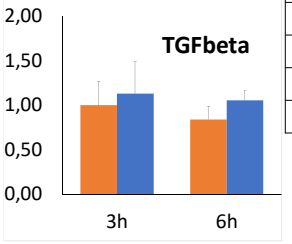












	Untreated wounds				Treated wounds			
Time (h)	M1	M2	M1/ M2	Other	M1	M2	M1/ M2	Other
0	42	39	9	10	40	40	9	11
1	44	41	10	5	43	42	11	8
3	46	38	12	4	30	42	20	8
6	28	50	14	7	8	48	36	7
9	19	40	25	16	13	39	38	10
12	20	40	23	17	12	37	40	12
18	14	33	43	8	7	36	47	12
24	4	10	70	15	5	7	71	16

Treated
Not treated

- Higher **immunity reaction** in **1 - 6 hours**, a lower degree of inflammation after 24 hours

In vivo tests

Promoting wound healing in difficult wounds (selected patients)

Difficult wounds: Pressure ulcer

T0 **After #1 treatment** **After #2 treatment** **After #3 treatment** **After #4 treatment**

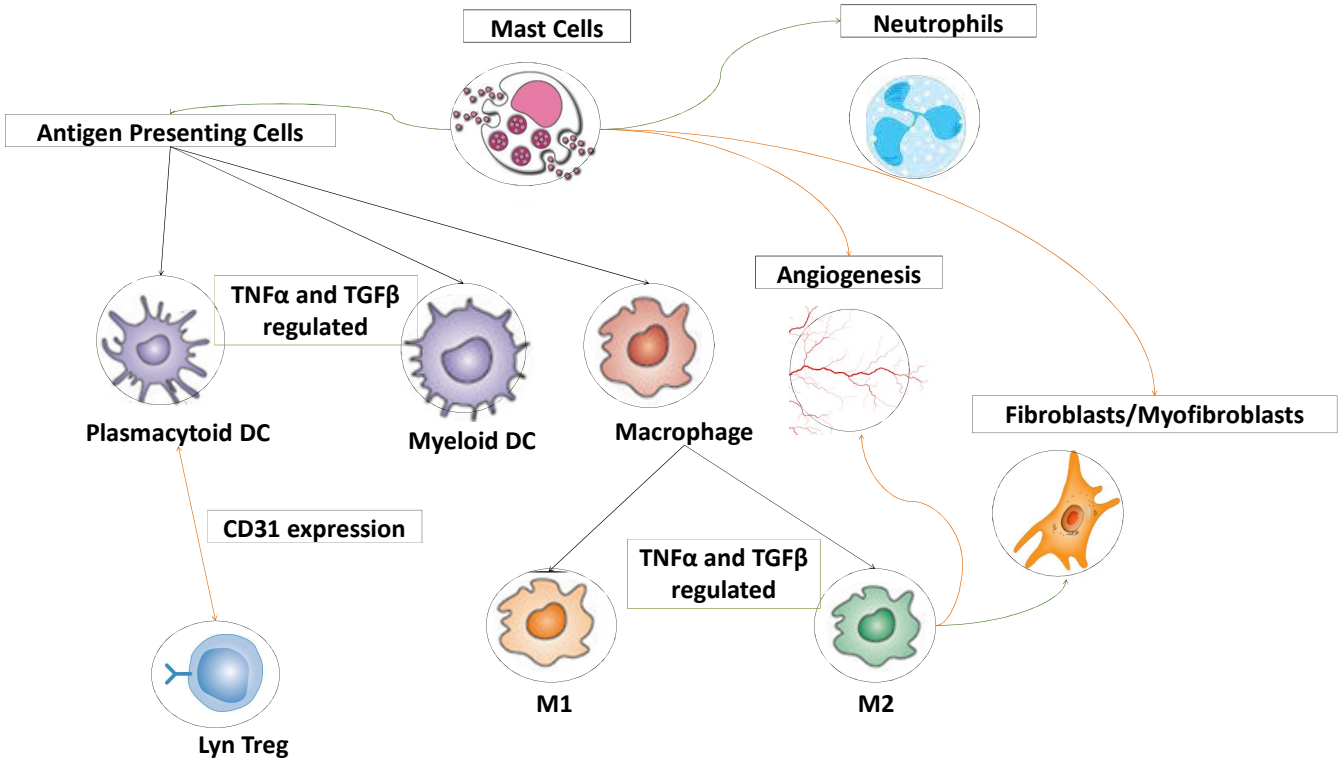
Difficult wounds: Trauma ulcer

T0 **After #1 treatment** **After #2 treatment** **After #3 treatment** **After #4 treatment** **After #5 treatment**

Conclusions

- Effects of blue LED wounds irradiation:

1. Acceleration of the early healing phase



2. Improvement of the healing process in superficial abrasions and in difficult wounds