The Decrease of Psoriatic Redness by PEMF in IL 17A-treated Keratinocytes

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Introduction

- Psoriasis is a long-lasting autoimmune disease characterized by patches of abnormal skin. Once pathogenic T cells have entered the skin, they become activated and release cytokines and chemokines to attract other immune cells to perpetuate the inflammatory cascade.
- Keratinocytes play an important role in the regulation of skin immune response, responding to environmental stimuli. The IL-17 is a proinflammatory cytokine produced by activated T cells. High levels of this cytokine are associated with several chronic inflammatory disease including psoriasis.
- Pulsed Electromagnetic Fields (PEMFs) can provide noninvasive treatment for reducing inflammation. An anti-inflammatory mechanism of action is based on in vitro capability of PEMFs to increase the number of A_{2A} adenosine receptors in human neutrophils.

Aims

In this report we identified genes expressed by IL-17A in Human Keratinocyte cell lines. We investigated that PEMFs can reduce psoriatic redness through inhibition mechanism of PAR2.

Design of PEMFs

- A pulsed EMF ($B_m = 10\text{mT}$, $f = 50\text{ Hz}$) was used in this study.

- The waveform generated by the function generator and its definition. The pulsed electromagnetic field (PEMF) signal consisted of a 5 ms pulse burst, containing 20 pulses, repeated at 50 Hz. The wait time until the next burst signal was about 15 msec.
- Mechanical signals were applied to these cells continuously for experimental days. After exposure of the cells, we performed RT-PCR, real time PCR and western blot for biological analysis.

Results

Figure 1. The reduction of CXCL series genes by PEMF in IL-17A treated HaCaT Keratinocyte Cell lines.

Figure 2. The inhibition of PAR2 by PEMF in IL-17A treated HaCaT Keratinocyte Cell lines.

Figure 3. The decrease of ERK activation by PEMF in IL-17A treated HaCaT Keratinocyte Cell lines.

Conclusions

- ♣ When IL-17A treated, the expression of both CXCL 1,3,5,6 were increased in HaCaT Keratinocyte cell lines. By PEMF their expression was decreased.
- ♣ PAR2 does not activated by PEMF. It is related with ERK signaling deactivation. It seems that PEMF is act like PAR2 inhibitor.
- ♣ Finally, we can suggest that the positive possibility of PEMF treatment in psoriasis.

Acknowledgement

This work was supported by the National Research Foundation of Korea (NRF) grant funded by the Korea government (Grant number : 2015R1C1A2A01054257) and the National Research Foundation of Korea(NRF) and the Center for Women In Science, Engineering and Technology(WISET) Grant funded by the Ministry of Science, ICT & Future Planning of Korea(MSIP) under the Program for Returners into R&D (WISET-2017-041).