Inflammation and Pain in Skin and Deep Tissues

By

Silvia Lo Vecchio

Ultraviolet-B irradiation model has been used for many years as a translational model since it is well known to induce cutaneous inflammatory pain in both animals and humans. The aim of this study project was to evaluate time course and sensory changes induced by UVB and in particular: 1) evaluate the change in sensitivity after inflammation inside and outside the irradiated skin, 2) investigate the existence of a mechanism of cumulative effects between cutaneous and deep-tissue hyperalgesia, 3) investigate the effect on mechanical hyperalgesia and allodynia induced by UVB irradiation after application of heat stimuli and sensitization of deep tissues.

The results of this PhD project demonstrated that not only UVB irradiation induces cutaneous primary and secondary hyperalgesia to mechanical and pressure stimulations, but also induces an increase in cutaneous blood flow. The results also confirmed that UVB irradiation induced a leftshift of the stimulus-response curve, relating pressure stimulation to pain intensity, and facilitation of temporal summation to repetitive pressure stimuli. Moreover, UVB model induces long and stable areas of allodynia and hyperalgesia up to 72 h after skin irradiation that can be increased and prolonged after heat application. It was also found that muscle hyperalgesia induced by NGF injection does not suppress or potentiate the effect of UVB irradiation or heat rekindling on the areas of allodynia and hyperalgesia.

After combination of cutaneous hyperalgesia (UVB model) and muscle hyperalgesia (DOMS), the data support the conclusion that muscle hyperalgesia may enhance the UVB-induced vasodilatation, and that muscle hyperalgesia induced by DOMS does not induce any change in UVB-induced cutaneous hyperalgesia. In conclusion, the UVB-model can be considered a valid tool for the screening of new analgesics drugs having peripheral and central effects.
To fulfill the requirements for the Ph.D. degree, Siliva Lo Vecchio has submitted the thesis: Inflammation and Pain in Skin and Deep Tissues, to the Faculty Council of Medicine at Aalborg University.

The Faculty Council has appointed the following adjudication committee to evaluate the thesis and the associated lecture:

Dr. Angelo Reggiani  
Italian Institute of Technology, Genova  
Italy

Dr. Nanna Finnerup  
Aarhus University, Aarhus  
Denmark

Chairman:  
Associate Professor Carsten Dahl Mørch  
Center for Sensory-Motor Interaction, Aalborg University  
Denmark

Moderator:  
Professor Lars Jelstrup  
Aalborg University Hospital, Aalborg  
Denmark

The Ph.D. lecture is public and will take place on:

Friday 16 January 2015 at 13:00  
Aalborg University – Room D2-106  
Fredrik Bajers Vej 7 D2  
9220 Aalborg East

Program for Ph.D. lecture on

Friday 16 January 2015

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Inflammation and Pain in Skin and Deep Tissues

Chairman:  
Associate Professor Carsten Dahl Mørch

Moderator:  
Professor Lars Jelstrup

13.00  
Opening by the Moderator

13.05  
PhD lecture by Siliva Lo Vecchio

13.50  
Break

14.00  
Questions and comments from the Committee
  Questions and comments from the audience at the
  Moderator’s discretion

16.00  
(No later than)
  Conclusion of the session by the Moderator

After the session a reception will be arranged.