β-glucan enriched bath directly stimulates the wound healing process in common carp (Cyprinus carpio L.) - DTU Orbit (30/09/2019)

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Wound healing is a complex and well-organized process in which physiological factors and immune mechanisms are involved. A number of different immune modulators have been found to enhance the non-specific defence system in vertebrates, among which β-glucans are the most powerful and extensively investigated.

The aim of the present study was to investigate the biological impact of two different commercially available β-glucan containing products on the wound healing process in carp. Throughout a two-week experiment fish were either untreated (control), or in water supplemented with the two different types of β-glucans. The wound healing process was monitored using a multispectral visualisation system. The correlation between wound closure and immune response was investigated by measuring the gene expression patterns of IL-1β, IL-6 family member M17, IL-8 and Muc5b, and measurement of production of radical oxygen species. PAMPs/DAMPs stimulation caused by the wounding and or β-glucans resulted in an inflammatory response by activating IL-1β, IL-6 family member M17 and IL-8 and differences in the expression pattern were seen depending on stimuli. IL-1β, IL-6 family member M17 and IL-8 were activated in all wounds regardless of treatment. Expression of all three interleukins was highly up-regulated in control wounded muscle already at day 1 post-wounding and decreased at subsequent time-points. The reverse was the case with control wounded skin, where expression increased from day 1 through day 14. The results for the β-glucan treated wounds were more complex. The images showed significantly faster wound contraction in both treated groups compared to the control. The obtained results clearly demonstrated that a β-glucan enriched bath promotes the closure of wounds in common carp and induce a local change in cytokine expression.

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General information
Publication status: Published
Organisations: National Food Institute, Division of Industrial Food Research, University of Veterinary Medicine Hannover, Foundation
Contributors: Przybylska, D. A., Schmidt, J., Jiménez, N. I. V., Steinhagen, D., Nielsen, M. E.
Pages: 998-1006
Publication date: 2013
Peer-reviewed: Yes

Publication information
Journal: Fish and Shellfish Immunology
Volume: 35
Issue number: 3
ISSN (Print): 1050-4648
Ratings:
BFI (2013): BFI-level 1
Scopus rating (2013): CiteScore 3.11 SJR 0.997 SNIP 1.135
Web of Science (2013): Impact factor 3.034
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
Original language: English
Keywords: Carp, Cyprinus carpio L., β-glucan, Wound healing, Gene expression
DOIs:
10.1016/j.fsi.2013.05.014

Bibliographical note
The European Union Seventh Framework Programme (FP7/ 2007-2013) under Grant agreement number PITN-GA-2008- 214505 supported research leading to this paper. We thank Bjørn Skovlund Dissing and Martin George Ljungqvist for technical help with images analysis.

Source: dtu
Source ID: u::8450
Research output: Contribution to journal › Journal article – Annual report year: 2013 › Research › peer-review