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## Immunopharmacology and Immunotoxicology

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## Effect of acute pain on splenic NK cell activity, lymphocyte proliferation and cytokine production activities

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## Abstract

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Various types of physical and physiological stress in animals have been shown to affect their humoral and cell-mediated immune responses. The present study was designed to investigate the possible influence of acute pain on the immune system. BALB/c mice were exposed to an increasing number of heat shocks using a Tail Flick apparatus; an equal number of control mice received no shock treatments. After each of the regimens was completed, the spleen of each mouse was recovered and various cell populations isolated to assess: the proliferative response to phytohemagglutinin by lymphocytes; cytotoxic activities of natural killer (NK) cells; and, the production of select important cytokines by splenic lymphocytes. The results indicated that NK cell activity and proliferation of lymphocytes were significantly ( $p < 0.001$ ) increased due to the shock regimens after only a single day's rounds of stimulation (i.e., 3 rounds of 12 equally time-spaced shocks/hr with 30-45 min gap between rounds). After 2 and 3 days' rounds of stimulations, no significant changes were detected in the proliferative response of isolated lymphocytes; conversely, the activity of NK cells remained significantly elevated compared to the controls hosts' cells, even on the second day of stimulation but not on the third. Regarding effects on cytokines, no significant changes were detected in the amount of Interferon- $\gamma$  (IFN $\gamma$ ) and Interleukin-10 (IL-10) produced by lymphocytes obtained from the spleens of any of the shocked mice. These results could suggest that certain acute stressors might actually strengthen a host's immunological reactivity and, possibly, result in an enhanced capacity to resist pathogens that might infect the body. Copyright © Informa Healthcare USA, Inc.

## Reaxys Database Information

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## Author keywords

Acute Pain; Cytokines; Cytotoxicity; Lymphocytes; NK Activity; Proliferation

## Indexed keywords

EMTREE drug terms: gamma interferon; interleukin 10; phytohemagglutinin

EMTREE medical terms: animal cell; animal experiment; animal model; animal tissue; article; Bagg albino mouse; cell activity; cell isolation; cell population; cell stimulation; controlled study; cytokine production; cytotoxicity; cytotoxicity test; female; heat shock; heat shock response; host cell; immune response; immune system; lymphocyte; lymphocyte proliferation; mononuclear cell; mouse; natural killer cell; nonhuman; pain; priority journal; spleen cell; tail flick test

MeSH: Animals; Cell Proliferation; Cytokines; Female; Heat-Shock Response; Interferon Type II; Interleukin-10; Killer Cells, Natural; Lymphocytes; Mice; Mice, Inbred BALB C; Monocytes; Pain Medline is the source for the MeSH terms of this document.

Species Index: Animalia; Mus

Chemicals and CAS Registry Numbers: gamma interferon, 82115-62-6; phytohemagglutinin, 9008-97-3; Cytokines; Interferon Type II, 82115-62-6; Interleukin-10, 130068-27-8

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