

Dermatological effects of weathered petroleum exposure (844.18)

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Abstract

Nearly 5 million barrels of oil were released into the Gulf of Mexico following the Deepwater Horizon oil well failure, making it undoubtedly the largest environmental disaster response effort in U.S. history. Spill remediation workers were continuously exposed to weathered oil and appeared to suffer a myriad of health effects, including contact dermatitis. However, the mechanism by which crude oil exposure induces skin inflammation has not been examined. To investigate this pathology, a mouse model of seven day exposure to weathered crude oil or acetone (control) was utilized, employing C57BL/6 and Balb/c mice. Immunohistochemistry, multiplex protein analysis, and real-time PCR were then conducted on skin samples isolated from each strain. Inflammatory cytokine expression showed that oil exposure increased IL-6, CXCL10, and CCL2 levels, the extent of which differed based on mouse strain. Histopathology showed obvious inflammation in the oil exposed skin, primarily characterized by epidermal thickening and neutrophil infiltration, and this was most pronounced in Balb/c mice. Oil exposure increased M1 macrophage skin infiltration but not M2 as indicated by CD86 versus CD206 expression respectively. These results suggest that weathered oil is indeed a skin irritant, and genetic predisposition may influence the severity of the skin inflammation.

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