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Skin inflammatory response to complex hydrocarbon mixtures (INC1P.357)

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Abstract

Petroleum whether as crude oil or as various refined products is known to variably cause skin irritation. For instance, spill remediation workers that are exposed to fresh and weathered oil appeared to suffer a myriad of health effects, including contact dermatitis. However, the relationship between the form of petroleum and its ability to induce skin inflammation has not been examined. To investigate this, a mouse model of seven-day exposure to crude oil (weathered and fresh), JP8 jet fuel (refined) or acetone (control) was utilized, employing C57BL/6 and Balb/c mice. Immunohistochemistry, multiplex protein analysis, and real-time PCR were then conducted on isolated skin samples. Inflammatory cytokine expression showed that oil exposure significantly increased IL-1b, IL-6, CXCL2, CXCL10, CCL2, CCL3, CCL4, and CCL11 levels, the extent of which differed based on the form of petroleum as well as mouse strain. Histopathology from all forms of petroleum showed obvious inflammation in exposed skin, primarily characterized by epidermal thickening and dermal inflammatory cell infiltration which was most pronounced from jet fuel exposure. Classically activated macrophages dominated M2-like as indicated by CD86 versus CD206

expression respectively for all petroleum types. These results suggest that petroleum is indeed a skin irritant, and its form whether fresh, weathered, or refined may influence the severity of the skin inflammation.

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