

THE GRADUATE COLLEGE OF THE
UNIVERSITY OF OKLAHOMA HEALTH SCIENCES CENTER

ANNOUNCES THE FINAL EXAMINATION OF

Jesse Kemp

FOR THE DEFENSE OF THE DOCTOR OF PHILOSOPHY DEGREE
GRADUATE COLLEGE
DEPARTMENT OF PHARMACEUTICAL SCIENCES



Tuesday, May 9, 2017, 9:00 a.m.
College of Pharmacy Building, Room 339, OUHSC

Dermatological Effects of Weathered Gulf Oil

COMMITTEE IN CHARGE: Randle Gallucci, Ph.D., Lester Reinke, Ph.D., Michael Ihnat, Ph.D., Michael McShan, Ph.D., Philip Kemp, Ph.D.

ABSTRACT: The Deepwater Horizon oil spill in the Gulf of Mexico (2010) is undoubtedly the worst marine oil spill in US history. Spill remediation workers are exposed to weathered oil and tend to suffer a myriad of health effects, including contact dermatitis. Since little is known concerning the effects of exposure to weathered crude oil, a mouse model was used to investigate this pathology. Denuded skin of BALB/c, C57BL/6 (wild type), and IL-6 deficient mice B6.129S2-Il6^{tm1Kopf/J} (IL-6KO) was exposed to weathered crude oil, crude oil or acetone (control) for 7 days. Histopathology revealed inflammation in the oil exposed skin, primarily characterized by epidermal hyperplasia and macrophage/monocyte infiltration which was most pronounced in weathered crude oil exposed skin. Multiplex analysis of skin inflammatory cytokine expression demonstrated that oil exposure increased IL-1 β , IL-6, VEGF-A, CXCL2, CXCL10, CCL2, CCL3, CCL4 and CCL11 protein levels, the extent of which varied based on the type of oil as well as mouse strain. Classically activated macrophages tended to dominate M2-like macrophages as indicated by CD206/CD86 mRNA expression ratio although this was dependent upon oil type. GC/MS analysis of skin samples revealed accumulation of aliphatic hydrocarbons that may have cumulative irritant qualities. These results suggest that oil is indeed a skin irritant and the type of oil and genetic background may influence the severity of skin inflammation.