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BIOACTIVITY OF OIL DISPERSANT USED IN THE DEEPWATER HORIZON CLEANUP OPERATION

On April 20, 2010, a well-head blowout on the Deepwater Horizon oil platform resulted in a major oil spill in the Gulf of Mexico, which released 4.9 million barrels (205.8 million gallons) of crude oil for nearly 3 months until the wellhead was successfully capped on July 15, 2010. In response, a major cleanup effort involving nearly 48,000 workers was initiated. One approach used in the cleanup effort was application of approximately 1.84 million gallons of chemical dispersant in an effort to break up the oil slick into more rapidly degradable oil droplets. Although some dispersant was applied subsurface, the majority was sprayed from airplanes or surface craft onto the oil slicks. Therefore, inhalation of oil dispersant, as well as a dermal exposure of workers, was possible during remediation efforts.

This special issue presents the research efforts of the National Institute for Occupational Safety and Health (NIOSH) to evaluate acute pulmonary and systemic responses to inhalation of COREXIT EC9500A, the chemical dispersant predominantly used during the Gulf oil spill. In addition, the dermal and immune responses to topical exposure to COREXIT EC 9500A are reported.

This special issue contains five research studies describing:

1. Design and operation of a system to generate a stable airborne concentration of oil dispersant (27 mg/m^3) for an acute (5-h) inhalation exposure of rats.
2. Characterization of the pulmonary responses (inflammation, damage, airway contraction, airway hyperreactivity, etc.) 1 and 7 d after acute inhalation exposure.
3. Characterization of changes in heart rate, blood pressure, and systemic arterial function 1 and 7 d after acute inhalation exposure.
4. Analysis of selected brain regions for alteration in neurotransmitter signaling imbalance in response to acute inhalation exposure.
5. Evaluation immune responses following topical exposure.

Results indicate that acute pulmonary and dermal exposure to oil dispersant caused measurable alterations in normal physiological function. NIOSH is currently conducting studies to evaluate responses to a more extended inhalation exposure (5 h/d for 9 d).

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