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Immune Suppression by Dermal Application of JP-8 Jet Fuel

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JP-8 FUELS, S-8 FUELS

Abstract:

The initial focus of this work was to test the hypothesis that dermal application of jet fuel induced immune suppression. Using a mouse model of dermal exposure we noted that applying JP-8 to the skin induced immune suppression. Both primary and recall immune reactions were suppressed by applying JP-8. Cytokine production by JP-8-treated keratinocytes particularly prostaglandin E2 and interleukin-10 drive immune suppression. During the current funding period we made three important discoveries. First, we found that the aromatic compounds within jet fuel drive immune suppression. When synthetic jet fuel (S-8), which is totally devoid of aromatic compounds, was applied to the skin, no immune suppression was noted. Adding back a cocktail of the 7 most prevalent aromatic compounds found JP-8 to S-8, rendered it immune suppressive. Second, we found that JP-8 activated cytokine production in skin cells by activating the production of reactive oxygen species, which in turn activated NF-kappaBeta, which led to cytokine production and immune suppression. Finally we found that applying JP-8 to the skin activated the migration of mast cells from the skin to the lymph nodes. Blocking the migration, by interfering with the signals that regulate mast cell migration, blocked immune suppression.

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