

## Aged Mice Have A Hyperinflammatory Response To Organic Dust Exposure

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**Introduction:** Older farmers are active members of the agricultural workforce, with nearly 1 million farmers over the age of 65 currently working in agriculture. Older farmers suffer from more respiratory symptoms than their non-farming counterparts and are more likely to develop chronic respiratory disease. The unique respiratory risks of the elderly working in agriculture are not known. Likewise, the mechanisms for this vulnerability are currently unknown.

**Methods:** “Young” BALB/c mice aged 2 mo., and “older” mice aged 12 mo. were exposed to an aqueous organic dust extract (ODE) collected from a hog confinement facility. We used both an acute and repetitive model. In the acute model, mice were given a single nasal instillation and euthanized 5 hr later. In the repetitive model, they underwent daily instillation of ODE for 3 wk, and were euthanized 5 hr after the final instillation. Bronchoalveolar lavage (BAL) was collected for cell counts and differentials as well as inflammatory cytokine measurement.

**Results:** After a single instillation, we measured higher levels of KC and MIP-2 measured from BAL fluid in older mice compared to young mice. This increase was sustained after repetitive instillations over 3 wk. After the repetitive exposure, the older mice also had higher numbers of neutrophils in their BAL fluid. To investigate this hyperinflammatory response, we measured the following mediators of inflammation: Toll-like receptor 2 (TLR2), MyD88, TRAF, and TIRAP. We measured a significant increase in TLR2, TRAF and TIRAP mRNA in the airway epithelial cells of the older unexposed mice.

**Conclusions:** Older mice have a hyperinflammatory response to organic dust exposure that may be related to increases in expression of TLR2. This hyperinflammatory response could potentially explain increased respiratory symptoms in older farmers.

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