Introduction
Flaxseed (FS) is a nutritional supplement with high concentrations of (n-3) fatty acids and lignans that have anti-inflammatory and antioxidant properties. The use of FS in the prevention or treatment of acute lung disease is unknown. In this study, we evaluated diets with high FS content in experimental murine models of acute lung injury and inflammation. The kinetics of lignan accumulation in blood, following 10% FS supplementation, was determined using liquid chromatography tandem mass spectrometry. Mice were fed isocaloric control and 10% FS-supplemented diets for at least 3 wk and challenged by hyperoxia (80% oxygen), intratracheal instillation of lipopolysaccharide, or acid aspiration. Bronchoalveolar lavage was evaluated for white blood cells, neutrophils, and proteins after a 24 h postintra-tracheal challenge of hydrochloric acid or lipopolysaccharide, or after 6 d of hyperoxia. Lung lipid peroxidation was assessed by tissue malondialdehyde concentrations. The plasma concentrations of the FS lignans, enterodiol and enterolactone, were stable after mice had eaten the diets for 2 wk. Following hyperoxia and acid aspiration, bronchoalveolar lavage neutrophils decreased in FS-supplemented mice (P = 0.012 and P = 0.027, respectively), whereas overall alveolar white blood cell influx tended to be lower (P = 0.11). In contrast, neither lung injury nor inflammation was ameliorated by FS following lipopolysaccharide instillation. Lung malondialdehyde levels were lower in hyperoxic mice than in unchallenged mice (P = 0.0001), and decreased with FS treatment following acid aspiration (P = 0.011). Dietary FS decreased lung inflammation and lipid peroxidation, suggesting a protective role against pro-oxidant-induced tissue damage in vivo.