Pathologic mechanism of ferric chloride-induced pulmonary fibrosis

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Idiopathic pulmonary fibrosis (IPF) is considered a fatal respiratory disease. However, a large number of anti-fibrotic drugs described in the current experimental models including bleomycin (BLM)-induced fibrosis have not been translated into clinical practice successfully, suggesting that a new pulmonary fibrosis model mimicking most of pathological features of human IPF is needed. We established a new pulmonary fibrosis mouse model by injecting FeCl₃ solution into the left upper lobe central part. In our lung lobe-specific fibrosis model, fibrogenesis was progressive and irreversible, the feature of which mimics human IPF and cannot be observed in other lung fibrosis models. Here, we investigated how ferric chloride could induce pulmonary fibrosis.

At 10 days post-injury with ferric chloride, severe fibrosis of the whole lobe was observed. We temporally and spatially followed the injury process of the lung by monitoring the indices such as ferrous iron accumulation, production of Reactive oxygen species, endoplasmic reticulum stress and apoptosis. We also performed a comprehensive analysis of microRNAs expression. We will discuss the molecular mechanisms underlying pulmonary fibrosis induced by ferric chloride, compared with BLM-induced fibrosis model.