Levels of circulating MMP-7 degraded elastin are elevated in pulmonary disorders

Objectives: Elastin is a signature protein of the lungs. Matrix metalloproteinase-7 (MMP-7) is important in lung defence mechanisms and degrades elastin. However, MMP-7 activity in regard to elastin degradation has never been quantified serologically in patients with lung diseases. An assay for the quantification of MMP-7 generated elastin fragments (ELM7) was therefore developed to investigate MMP-7 derived elastin degradation in pulmonary disorders such as idiopathic pulmonary fibrosis (IPF) and lung cancer. Design and methods: Monoclonal antibodies (mABs) were raised against eight carefully selected MMP-7 cleavage sites on elastin. After characterisation and validation of the mABs, one mAB targeting the ELM7 fragment was chosen. ELM7 fragment levels were assessed in serum samples from patients diagnosed with IPF (n = 123, baseline samples, CTgov reg. NCT00786201), and lung cancer (n = 40) and compared with age- and sex-matched controls. Results: The ELM7 assay was specific towards in vitro MMP-7 degraded elastin and the ELM7 neoepitope but not towards other MMP-7 derived elastin fragments. Serum ELM7 levels were significantly increased in IPF (113%, p < 0.0001) and lung cancer (96%, p < 0.0001) compared to matched controls. Conclusions: MMP-7-generated elastin fragments can be quantified in serum and may reflect pathological lung tissue turnover in several important lung diseases.

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