

## Emerging perspectives on IPF pathogenesis

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Research Theme/Topic: Different approaches to understand the IPF pathogenesis

Idiopathic pulmonary fibrosis (IPF) is leading cause of chronic respiratory failure and remain associated with poor prognosis and limited therapeutic options. This disease is strongly linked to aging, smoking, occupational and environmental exposures, and is increasingly recognized as disorder driven by epithelial dysfunction, aberrant tissue repair and modified immune system. In IPF the fibroblast activation and progressive fibrotic remodelling are promoted, leading to irreversible destruction of lung architecture.

In order to understand the IPF pathogenesis and to compare with other chronic lung diseases a double approach will be employed:

1) *In vitro* studies: Different cell lines and primary human cells representing distinct compartments of the respiratory tract will be cultured. Disease-like phenotypes of IPF will be established using specific chemical stimuli to reproduce key pathological features *in vitro*.

2) Animal models: *In vivo* models of pulmonary fibrosis will be employed to investigate disease mechanisms and validate findings obtained from *in vitro* studies, in collaboration with pathologists of the University of Pavia, Department of Molecular Medicine, University of Pavia.

In addition, thanks to the collaboration with Pulmonologists (IRCCS Policlinico San Matteo), some bronchoalveolar lavage (BAL) could be analysed.

**Techniques:** Human cell cultures, animal models. Cell cultures, Co-cultures, Spheroid formation, Immunofluorescence, Western Blotting, Flow Cytometry, ELISA, Histology, Immunochemistry, Immunohistochemistry (IHC), qRT-PCR, DNA damage assay (Comet Assay,  $\gamma$ H2AX), Adhesion and Migration assay (Boyden chamber, Wound healing assay), Proteomic analysis, Real Time Cell Metabolic Analysis (Sea Horse).

