Molecular and cellular mechanisms linking air pollution and lung diseases.

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Air pollution is a ubiquitous and complex source of exposure and its effects on health are not easy to study. The mixture of air pollutants is not fully characterized nor easily replicable in experiments involving the exposure of animals or humans. Experimental studies tend to investigate the toxicological properties of individual pollutants rather than the complex interactions taking place in the mixture. Epidemiological studies use one or more pollutants as markers of the mixture of pollutants (e.g. NO2 or PM10) but the correlations between some pollution markers and their health effects do not necessarily reflect a simple causal relationship. The use of particulate matter (PM) in animal studies is a new attempt very important to mimic real conditions in the setting experimental. PM consists of microscopic solids and liquid droplets. These particulates and their precursor chemicals are emitted from many natural and man-made sources, including volcanic activity, burning of biomass, vehicle emissions, coal-burning powerplants, and other industrial activities (ref). The aim of this project is to study the biological/toxicological effects of a source-specific PM rather than a single pollutant. In this context, through an active collaboration with Agenzia Regionale per la Protezione dell'Ambiente (ARPAC), the project aims to integrate analytical techniques and sampling with pharmacological experimental techniques to evaluate the impact on respiratory pathologies. By using an integrated *in vitro* an *in vivo* approach, we will investigate on molecular and cellular mechanisms linking air pollution and lung diseases as well as on the impact of air pollution on chronic variations of the physiological functions of the respiratory system.

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