Content archived on 2024-06-18

Computational study of the interaction between inhaled carbon nanoparticles and lung membranes

Fact Sheet

Project Information

PLUM

Grant agreement ID: 274821

Project terminated

Start date
1 June 2011

End date
31 May 2013

Funded under
Specific programme "People" implementing the Seventh Framework Programme of the European Community for research, technological development and demonstration activities (2007 to 2013)

Total cost
€ 179 548,00

EU contribution
€ 179 548,00

Coordinated by
INSTITUT NATIONAL DE LA SANTE ET DE LA RECHERCHE MEDICALE
France

Objective

"We hereby propose a study on the physical and biological basis of the interaction between inhaled carbon nanoparticles and lung membranes, by computational approach.

The past decades have seen hundreds of new applications of nanomaterials developed and patented. At the same time, the scientific community is encouraged to devote research efforts to assess the safety of nanotechnology products. The PLUM project focuses on the effects of inhaled carbon nanoparticles and carbon nanotubes. Inhalation of carbon nanoparticles, one of the major byproducts of combustion processes, may happen to all of us, when stuck in a traffic jam in our city. Specialized workers may be exposed, as well, during the production or dispersion of carbon nanoparticles and nanofibers, or when cutting or re-processing a composite material containing carbon nanotubes. During inhalation, the first barrier which nanoparticles bump into is the lung membrane, which coats the inner surface of alveoli. Lung membranes are our first line of defense against foreign substances attempting to enter our organism via air and they are crucial for breathing, regulating gas exchange at the water-air interface of the alveoli.

Understanding the mechanisms of nanoparticle interaction with lung membranes is a fundamental step for the assessment of NPs hazardousness. PLUM will pursue this objective by studying this interaction at molecular level, addressing at the same time physical and biological effects by computational techniques. We will consider both carbon nanoparticles and nanotubes, and we will investigate their influence on the membrane properties and the mechanism of permeation through lung membranes. These effects will be studied as a function of physical properties (e.g. size, shape) and chemical features (coating and functionalization). PLUM will mainly rely on Molecular Dynamics simulations, and it will devote important efforts to the development of new models at all-atom and coarse-grained level."

Fields of science (EuroSciVoc)

engineering and technology > materials engineering > **composites**

engineering and technology > materials engineering > **coating and films**

engineering and technology > nanotechnology > **nano-materials**

Programme(s)

FP7-PEOPLE - Specific programme "People" implementing the Seventh Framework Programme of the European Community for research, technological development and demonstration activities (2007 to 2013)

Topic(s)

FP7-PEOPLE-2010-IEF - Marie-Curie Action: "Intra-European fellowships for career development"

Call for proposal

FP7-PEOPLE-2010-IEF
See other projects for this call

Funding Scheme

MC-IEF - Intra-European Fellowships (IEF)

Coordinator

INSTITUT NATIONAL DE LA SANTE ET DE LA RECHERCHE MEDICALE

EU contribution

€ 179 548,00

Total cost

No data

Address

RUE DE TOLBIAC 101
75654 Paris
France

Region

Ile-de-France > Ile-de-France > Paris

Activity type

Research Organisations

Links

Contact the organisation Website
Participation in EU R&I programmes
HORIZON collaboration network

Last update: 26 May 2022

Permalink: https://cordis.europa.eu/project/id/274821