Revealing the composition and formation mechanism of carcinogenic asbestos bodies in human lungs

Fact Sheet

Project Information

BiominAB-3D

Grant agreement ID: 707905

Project website

DOI
10.3030/707905

Project closed

EC signature date
24 February 2016

Start date
1 May 2016

End date
22 May 2018

Funded under
EXCELLENT SCIENCE - Marie Skłodowska-Curie Actions

Total cost
€ 180 277,20

EU contribution
€ 180 277,20

Coordinated by
CONSIGLIO NAZIONALE DELLE RICERCHE
Italy

Objective

When it is inhaled, asbestos triggers a chain of events that can lead to mesothelioma, an aggressive cancer of the lung lining, and to lung cancer. After prolonged stay in the lungs the asbestos fibers develop an iron coating that is thought to be responsible for the cytotoxic response, and which nature is still unclear. The fibres with their coating, developed after prolonged stay in human lungs, are known as asbestos bodies. Despite the large and increasing incidence of respiratory/pulmonary diseases

among the general population due to asbestos and other toxic fibers, the carcinogenic mechanism is not yet fully understood. A deeper knowledge of the interaction between the fibers and the biological tissue can help scientists to develop more efficient medical treatments and to improve prevention strategies. The proposed research project aims to reveal the composition and formation mechanism of asbestos bodies combining cutting-edge synchrotron radiation fluorescence and imaging microtomography and microdiffraction with transmission electron microscopy. Synchrotron radiation techniques will allow revealing the elemental distribution and morphology of unaltered lung tissue samples with unprecedented level of detail, preserving their tridimensional structure. Microdiffraction and transmission electron microscopy will reveal possible degradation of the embedded asbestos fibres, which is a long standing question. The project will exploit an innovative collaboration between physicists, chemists, doctors, and biologists. In particular, physics techniques usually employed in the field of fundamental research or in material science will be combined with laboratory methodologies, creating an environment favourable for breaking-through results. The methodologies developed during the project can be extended to the study of other toxic particulate, such as vehicular or industrial particulate matter and man-made nanoparticles, which are of increasing concern for human health.

Fields of science (EuroSciVoc)

engineering and technology > materials engineering > **fibers**

medical and health sciences > clinical medicine > oncology > **lung cancer**

natural sciences > biological sciences > biochemistry > biomolecules > **proteins**

natural sciences > physical sciences > optics > microscopy > **electron microscopy**

medical and health sciences > health sciences > infectious diseases > RNA viruses > **coronaviruses**

Programme(s)

H2020-EU.1.3. - EXCELLENT SCIENCE - Marie Skłodowska-Curie Actions MAIN PROGRAMME

H2020-EU.1.3.2. - Nurturing excellence by means of cross-border and cross-sector mobility

Topic(s)

MSCA-IF-2015-EF - Marie Skłodowska-Curie Individual Fellowships (IF-EF)

Call for proposal

H2020-MSCA-IF-2015

See other projects for this call

Funding Scheme

MSCA-IF-EF-ST - Standard EF

Coordinator

CONSIGLIO NAZIONALE DELLE RICERCHE

Net EU contribution

€ 180 277,20

Total cost

€ 180 277,20

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Region

Centro (IT) > Lazio > Roma

Activity type

Research Organisations

Links

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

Last update: 9 August 2022

Permalink: https://cordis.europa.eu/project/id/707905