

Nanopathology: a new vision

- Antonietta M. Gatti
 - Laboratory of Biomaterials, Dpt. Neurosciences,
 - University of Modena and ReggioEmilia, Italy
 - *Nanodiagnostics srl
-
- Dr. A. M. Gatti was the coordinator of the EC Project Nanopathology (QOL-2002-147) and is the coordinator of the Project DIPNA (NMP-2006-STRP 032131)

The project “Nanopathology” : The role of micro- and nano-particles in biomaterial- induced pathology verified that nanoparticle are already released unintentionally in the environment and impact on human health

Consortium



University of Modena and Reggio Emilia
LABORATORY of BIOMATERIALS



INFM - Istituto Nazionale
per la Fisica della Materia



Johannes Gutenberg University
Institute of Pathology



UNIVERSITY OF
CAMBRIDGE

Department of Materials and Metallurgy



France



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Italy

Project Coordinator

Dr. Antonietta M. Gatti
Laboratory of Biomaterials
University of Modena and Reggio Emilia
Via del Pozzo, 71 - 41100 Modena Italy
e-mail: gatti@unimore.it
e-mail: biomat@nanopathology.it
web page: www.nanopathology.net

Project Administrator

Dr. Emanuela Arata
INFM - The National Institute for the Physics
of Matter

Commission's Scientific Officer

Dr. Ana Nieto
European Commission- DG Research,
Unit E-2: Health, Food, and Environment
Brussels - Belgium
e-mail: ana.nieto@cec.eu.int

Partners

Prof. C. James Kirkpatrick
University of Mainz, Germany
e-mail: Kirkpatrick@pathologie.klinik.uni-mainz.de

Prof. William Bonfield
University of Cambridge, UK
e-mail: wb210@hermes.cam.ac.uk

Dr. Rosy Eloy
Biomatech SPA, France
e-mail: i.china@biomatech.fr

Dr. Alberto Tinti
FEI Italia, Italy
e-mail: atinti@it.feico.com



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Nano pathology

The Role of Micro
and Nanoparticles in
Biomaterial-Induced
Pathology

Project
QLRT-2002-147
(2002-2005)

Nanopathology

is the branch of learning that deals with how the organism reacts to the presence of micro- and nano-particles.

A new diagnostic tool was developed in order to visualize those particles in the human and animal pathological tissues. An Environmental Scanning Electron Microscope was employed equipped with an X-ray microprobe to detect foreign Bodies and identify their chemistry. The “traceability” between this pollutants and possible environmental sources was possible thanks to the identification of “markers”.

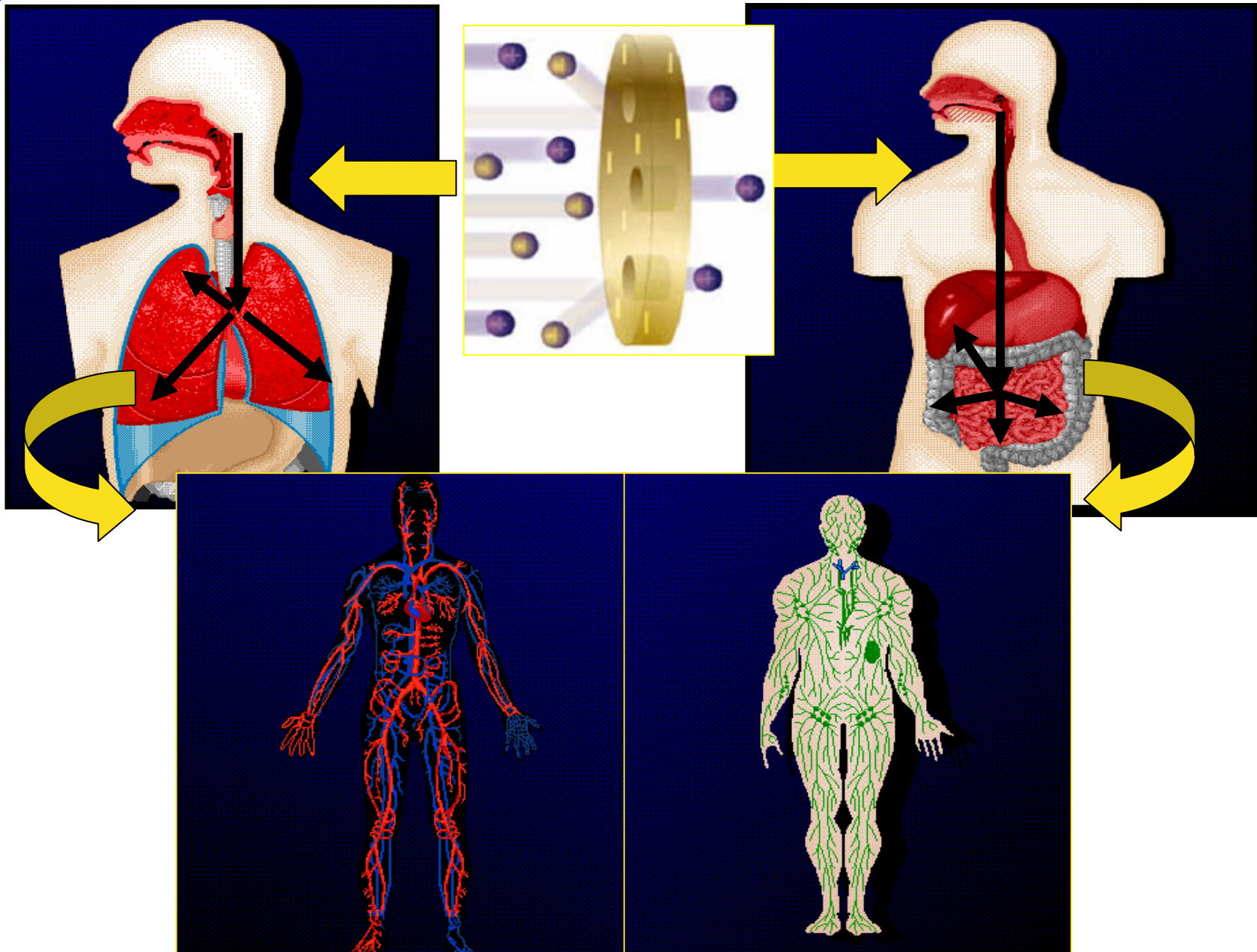


Within the project, more than 500 cases of pathologies of unknown origin were investigated:

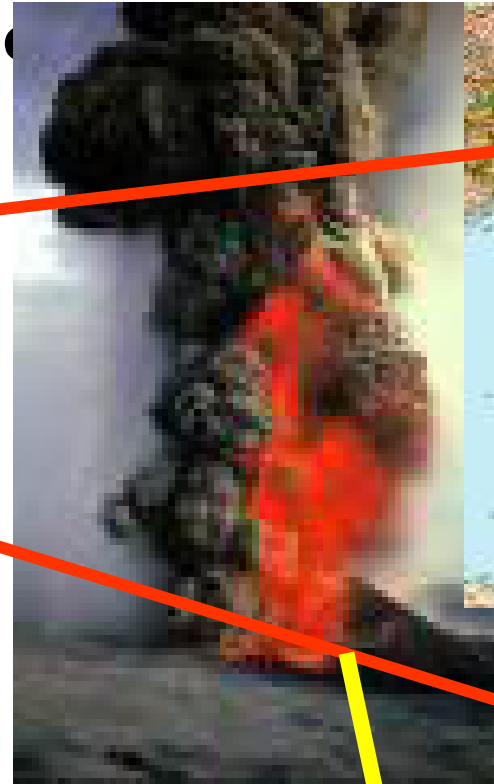
Lung, Liver, Colon, Brain cancer
Sarcoidosis, Crohn's disease
Criptogenic granulomatoses
Blood disorders, Leukemia
Lymphomas

In the samples the presence of foreign particulate matter was identified. Sometimes the origin of this pollution was found in working places, around incineration and power plants, in post-war sites. The reference samples were free of foreign bodies

Nanoparticles pass through the physiological barriers and reach the internal parts of the body



The environment can be polluted naturally like around a volcano



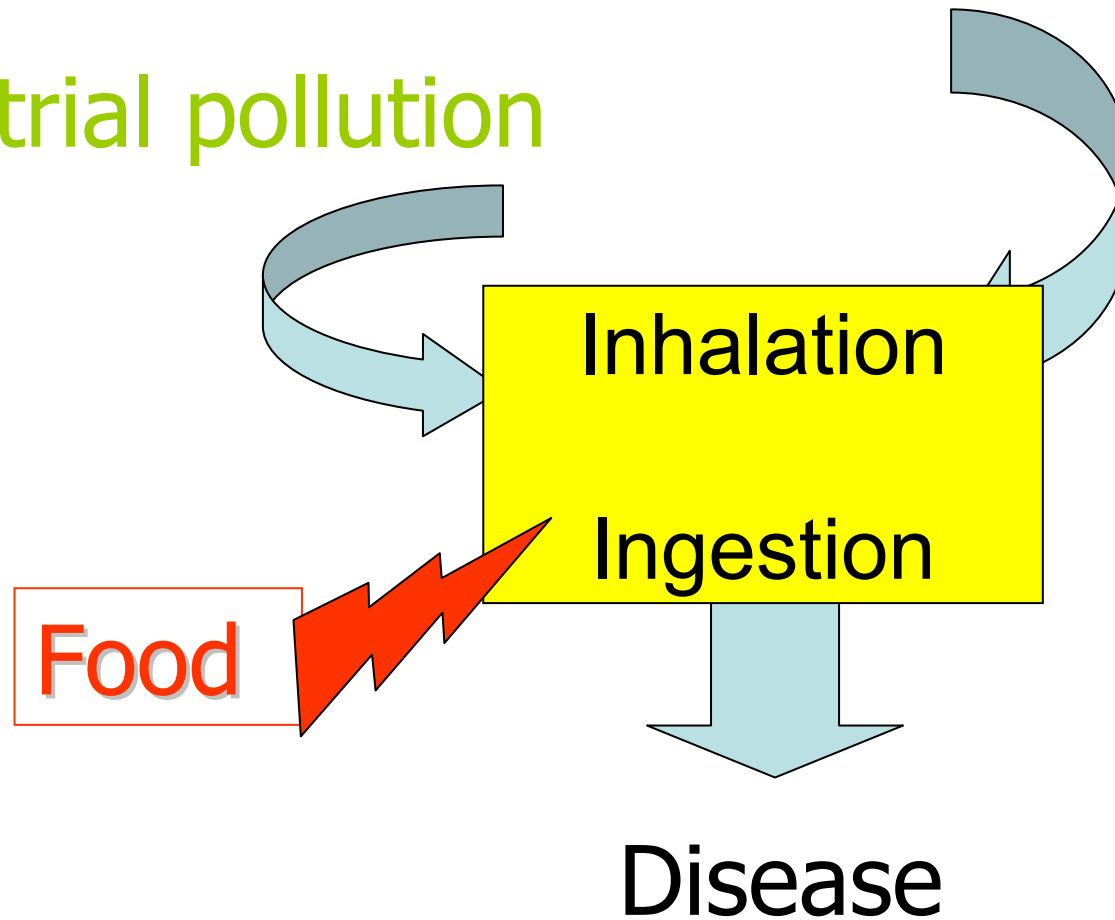
A cauliflower grown under Etna volcano during eruption entrapped ashes that were eaten along with a soup at a distance of 1000 Km.



Bio-economy

Environmental pollution

Industrial pollution



The EC project Nanopathology gave some answers.

Can nanoparticles have a pathological meaning in the human health ?

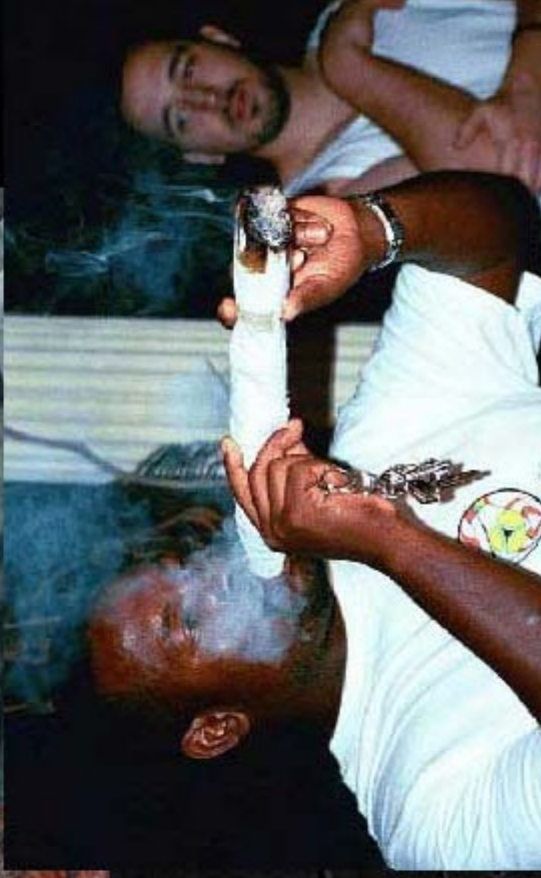
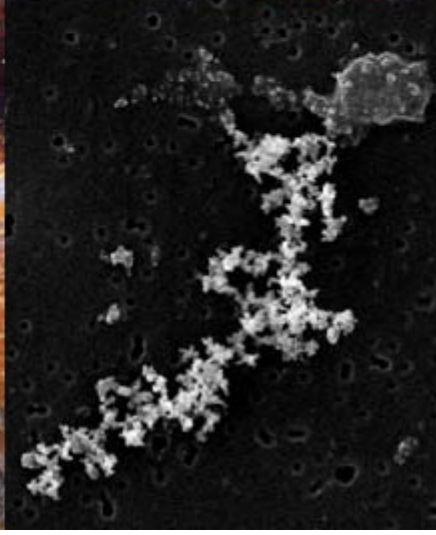
Evidence says: YES

Are normal cell defence reactions still valid?

Evidence says: NO

What is the interaction nanodust/organism (humans, animals, bacteria)?

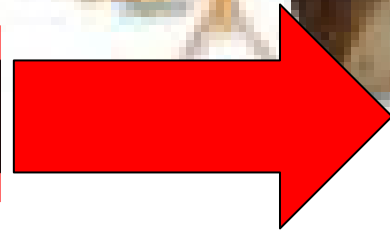
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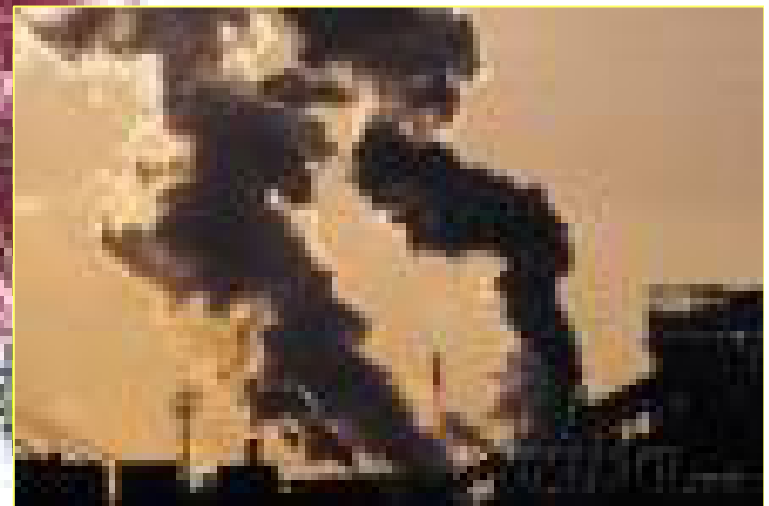
Is the growth still sustainable?



**Environmental
pollution**



Organic farming?





We cannot pretend not to see the problems

ENVIRONMENT:

The needs of research

- **chemical–physical identification of particulate matter (PM) in the environment (air and water) inside and close to industrial and trafficked sites and in post-war areas and Creation of a data bank for natural and industrial pollution.**
- **evaluation of the exposure of humans and animals through the identification of PM inside the pathological tissues and evaluation of the mechanisms of dissemination of PM in human/animal organisms**
- **identification of possible prevention measures and construction of devices for measure and protection.**
- **Identification of processes or technologies to decrease the pollution through an interdisciplinary and integrated work**