Nanomaterials

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The Benefits and Risks

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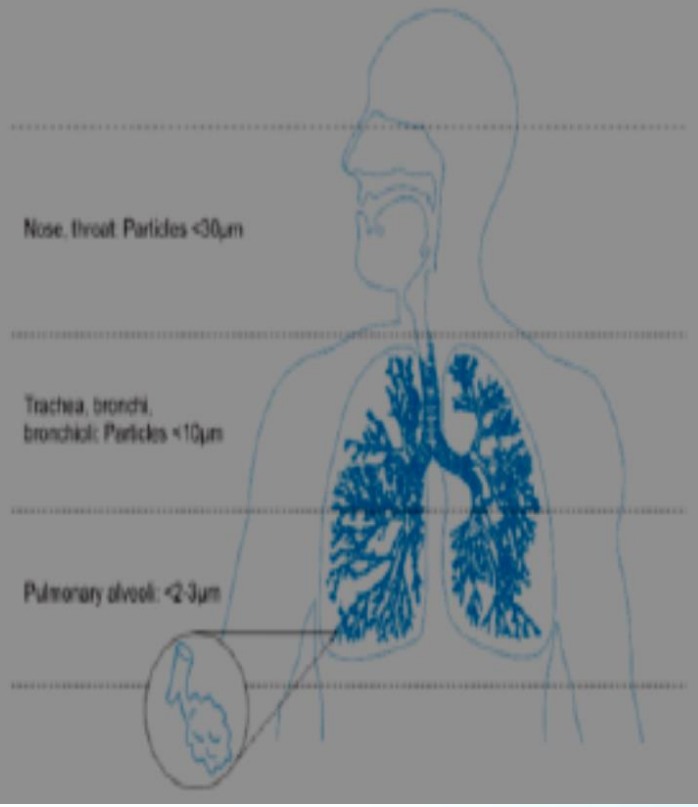
Nanomaterials' special physical and chemical properties may lead to unexpected interactions with biological and environmental systems.

Nanoparticles present possible danders, both medically and environmentally. Most of these are due to the high surface to volume ratio, which can make the particles very reactive.

Inhalation has been a major focus of the nanotoxicology community; NP penetration into the lung depends on its aggregation state

- Airborne NPs can be inhaled and deposit in the respiratory tract
- Inhaled NPs may enter the blood stream and translocate to other organs



Inhalation

The ability of a particle to deposit in the respiratory tract depends on its size. Particles larger than about 10 microns (10,000 nm) get trapped by the mouth, nose and throat; only particles less than ~10 microns enter the conductive airways . Nanoparticles' small size permits them to be inhaled into the alveolar (deep) region of the lung where gas exchange occurs. For this reason, many studies and guidance documents have focused on inhalation as the primary route of exposure to nanoparticles in the workplace.

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Inhalation Hazards

The growing body of research into the hazards of inhalation exposure of nanomaterials demonstrates the potential for unwanted health there is exposure. Not all types of nanoparticles have demonstrated these hazards and not all the research has been done on commercially relevant forms of the nanoparticles.