

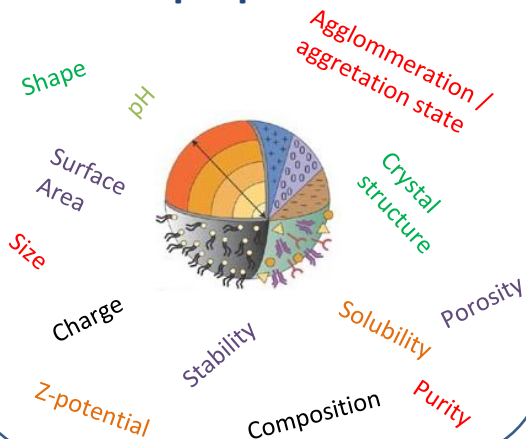
NANOMATERIALS: Being on the safe side

Maria Dusinska and Lise Marie Fjellsbø, NILU – Norsk Institutt for Luftforskning

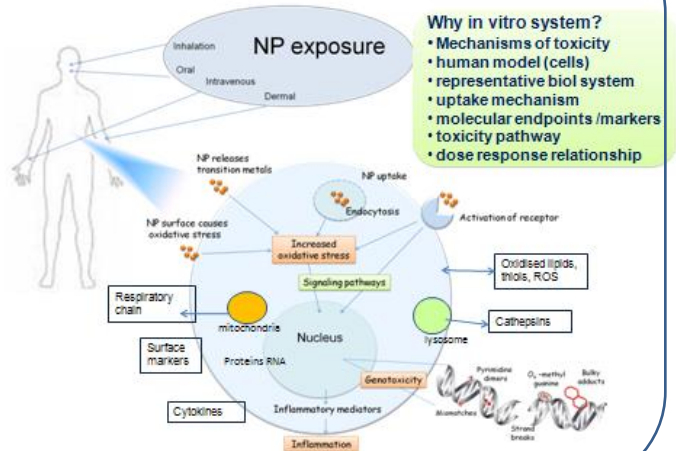
WHY to assess human health effects?

- The properties of nanomaterials differ from corresponding bulk material
- Typical effects of particles in the lungs and cardiovascular system is inflammation involved in atherothrombosis, asthma, chronic obstructive lung disease, pulmonary fibrosis and cancer
- NPs have a more pronounced effect on inflammation, oxidative stress, cell damage and cell stimulation than an equal mass of particles of the same material of greater size
- Same dimensions as biological molecules
- They can cross biological barriers and transport other pollutant into cells
- Small nanoparticles have been shown to be more able to reach secondary organs than larger ones
- Effects are extremely dependent on their physico-chemical properties
- Limited research of human exposure of these particles
- Sustainable development of nanotechnology
- Development of *in vitro* testing for safety nanomaterial

Physico-chemical properties



Nanoparticle (NP) exposure and mechanism of action on cell



NILU projects



NanoTEST

Alternative testing strategies for the assessment of the toxicological profile of nanoparticles used in medical diagnostics



The European Network on the Health and Environmental Impact of Nanomaterials

NanOmega

Marie Curie project on Novel approach to toxicity testing of nanoparticles

Qnano

European infrastructure project

NanoTOES

Marie Curie ITN project : Nanotechnology: Training Of Experts in Safety



PNRF-122

Impact of Nanomaterials on Human Health: Lessons from *in vitro* and animal models



SafeNano

Norwegian network on safety of use of nanomaterial.

NILU Health Effects Laboratory

In vitro methods to evaluate:

- **genotoxicity** (Comet Assay – DNA breaks, base lesions, DNA repair Micronucleus Assay)
- **cytotoxicity** (Proliferation Assays, colonyforming ability assays)
- **oxidative stress** (ROS: DCF-peroxil radicals and peroxides, NBT assay-superoxide anions),
- **neurotoxicity**

