

GOVERNO DE PORTUGAL
 INSTITUTO NACIONAL DE SAÚDE

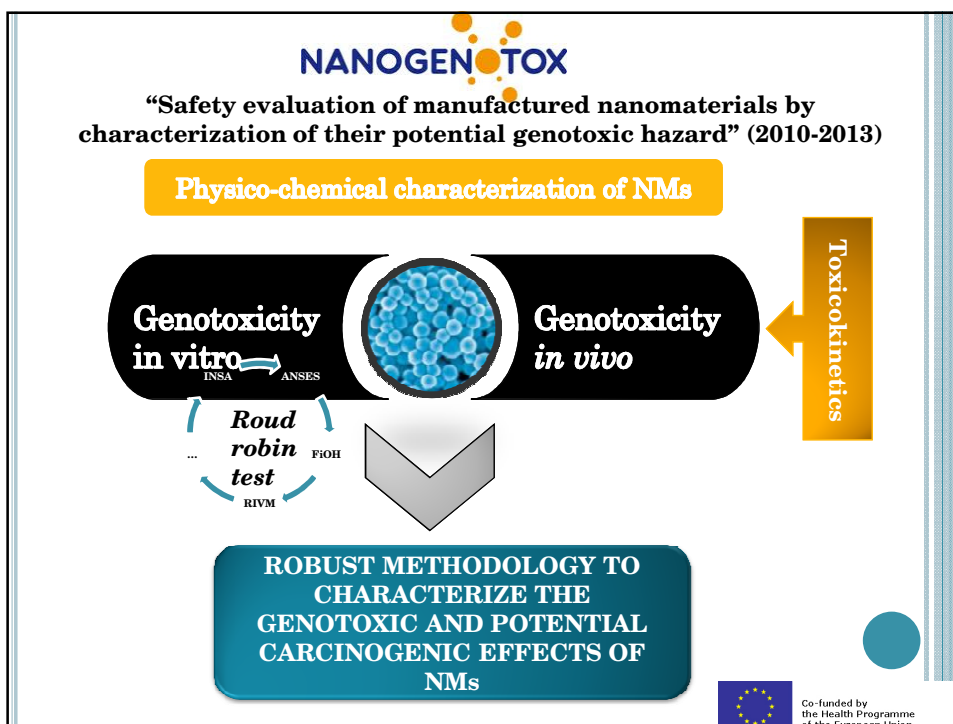
NANOGENOTOX

SAFETY INVESTIGATION OF NANOMATERIALS: ANALYSIS OF GENOTOXIC EFFECTS IN A BRONCHIAL EPITHELIAL CELL LINE

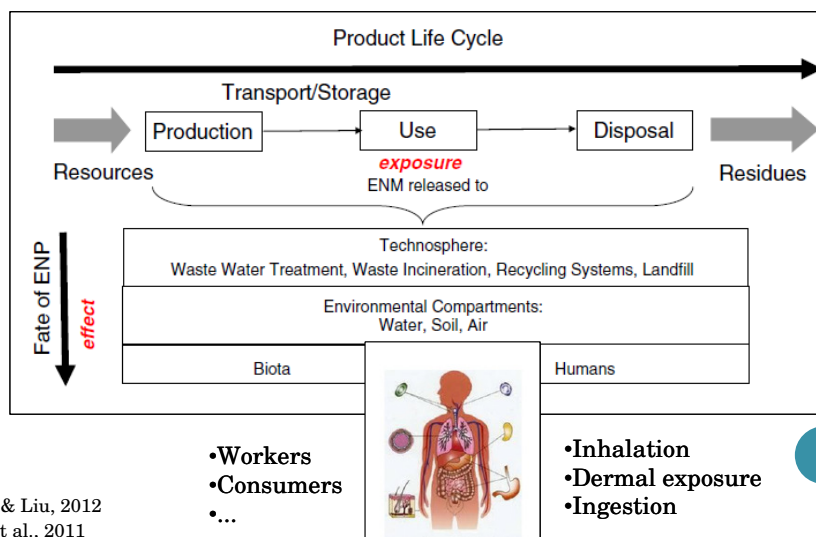
Maria João Silva

National Institute of Health
 Doutor Ricardo Jorge,
 Lisbon, PORTUGAL

m.joao.silva@insa.min-saude.pt



The wide applicability of NMs > increased risk of human exposure and environmental dissemination during their life cycle



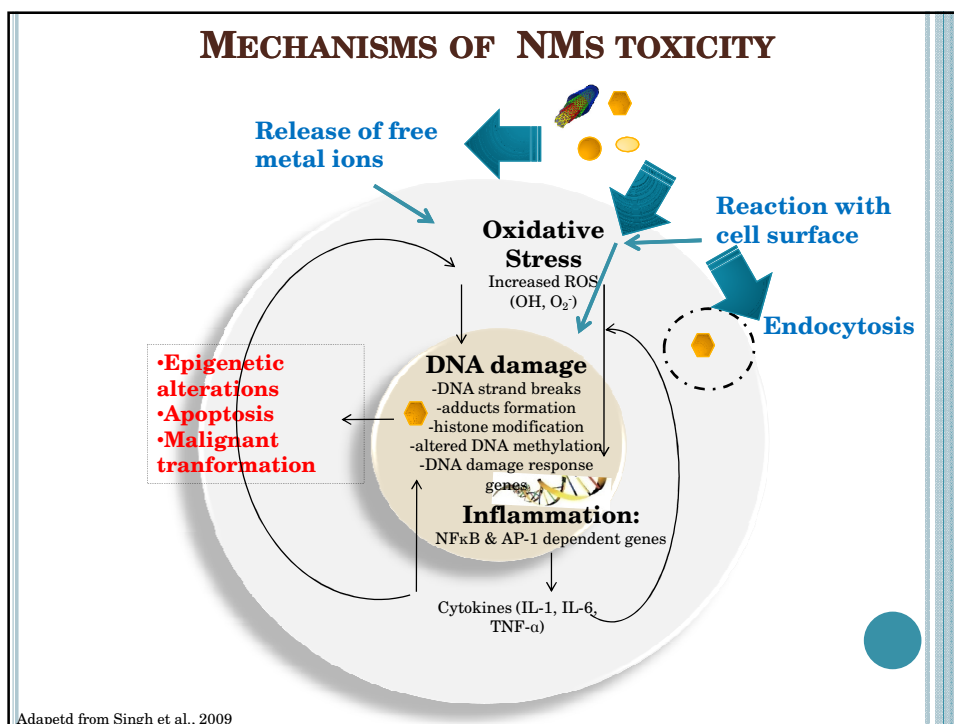
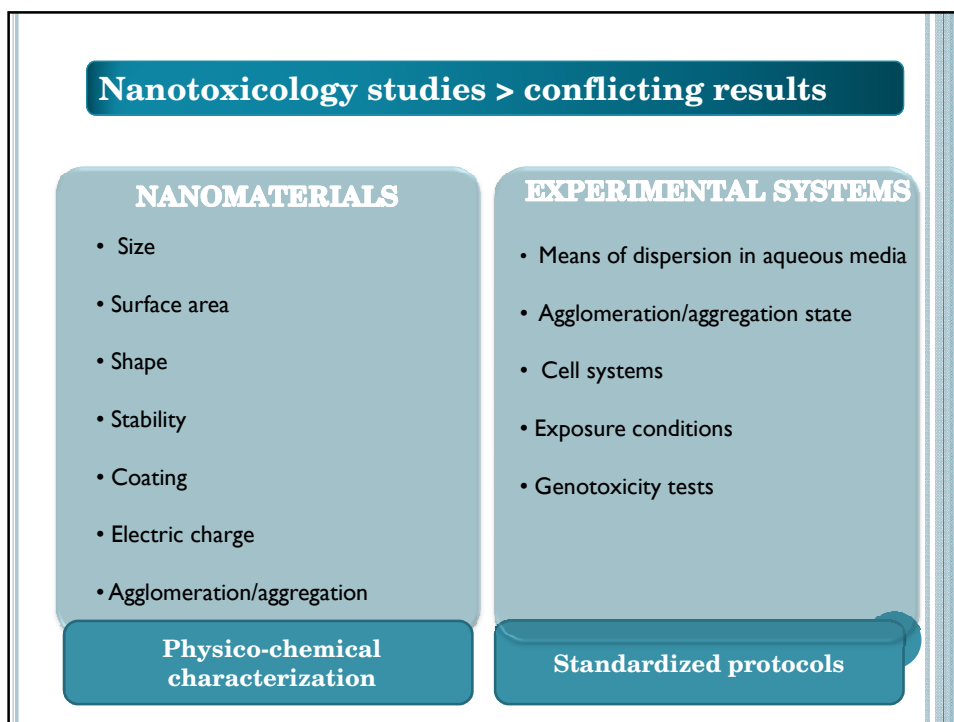
ALTHOUGH HUMAN EXPOSURE IS ALSO GROWING VERY FAST...



- Solid information about hazard is lacking for the vast majority of NMs, especially related to chronic exposure to low doses, that are likely to occur through consumers products.

SAFETY ?

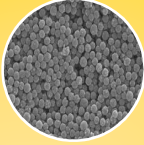
- The genotoxic effects of NMs, which may be linked to carcinogenic effects, are of special concern because cancer has a long latency period and thereby these effects can be less obvious and more difficult to predict than eventual acute effects.



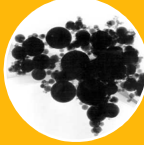
NANOGENOTOX

OBJECTIVES

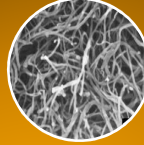
□ To assess the potential genotoxic effects of NMs in a human bronchial epithelial cell line (BEAS-2B cells) contributing to their safety evaluation.



Titanium dioxide (TiO₂)



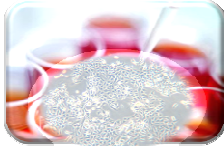
Synthetic amorphous silica (SAS)



Multiwalled carbon nanotubes (MWCNT)

← Genotoxicity in BEAS-2B cells →

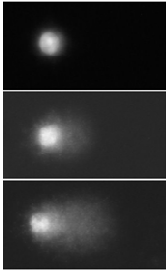
METHODS



3 and 24h exposure 48h exposure

exposure of BEAS-2 B cells to NMs

Comet assay

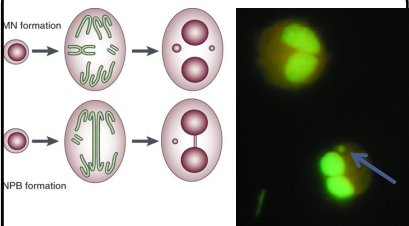


No damage

Moderate damage

Severe damage

Micronucleus assay



Cytokinesis-block proliferation index
CBPI = (MC+2BC+3MTC)/Total cells

Concurrent control cultures were also analysed: vehicle control, positive chemical controls (EMS and MMC) and a nanosized tentative control (ZnO, NM-110)

FINAL REMARKS

- **Difficulty in obtaining consistent results when testing the genotoxicity of nanomaterials**
- **Need to characterize the physico-chemical properties of each NM and try to associate to its biological effects**
- **Biological effects of low doses of NMs - more explored**
- **Mechanisms of NMs biological effects need to be further studied**