

# Overall objectives of WP1

(in close collaboration with WP5 (Dissemination))

- To **translate regulatory requirements into scientific questions** to conduct risk assessment and to implement risk management for nanomaterials in a variety of regulatory contexts.
- To collaborate with the other WPs in order to **ensure that they appropriately address the questions** so they build and test tools that will provide answers to the regulatory requirements.
- To **evaluate the resulting answers** and consider both the advantages and the drawbacks and limitations of the proposed tools.

# **Key Issues to be Adressed**

# 1- Identification and Characterization of Nanomaterials

- what is needed for identifying/characterising NMs and how to measure
  - This should address that characterisation might change from the originally manufactured nanomaterials during testing, use and fate etc. (cf. EFSA guidance)
- In other words, what stage of the material life cycle is to be considered (manufacture, testing, use,,)
- identification of characterisers (size, shape, surface treatment, surface area ...)
- measurement methods
- guidelines, incl. - dispersion, sample prep, dosimetry...
- How to determine sameness or non-sameness
- Nanomaterial definition: How to measure/proof whether or not a material is a nanomaterial?
- Information needed for dose descriptor

# **2- Detection, characterisation and quantification of nanomaterials in complex matrices**

- Nanomaterial interaction with biological media, cells, tissues, environment
- Including biomarkers for exposure and sampling techniques

# 3- Bio-distribution

- Toxicokinetics-ADME for ENMs'
- Do NMs distribute differently in organisms than non-NMs and what are the critical features that determine this?
- What is the relationship between external exposures and internal dose?

# 4- Exposure (measurements, models)

- How can exposure to nanoparticles/nanomaterials be assessed?
- Metric
- How do real life exposures relate to exposures in hazard testing?  
Needs the comparison between real life exposure and exposure in hazard testing to be different than for any other particulate or industrial chemicals?
- Biomarkers for exposure and sampling techniques
- Development of realistic exposure scenarios for workers (occupational health) and consumers
- Development of realistic exposure scenarios for the environment

# 5-Toxicity testing

- dispersion, sample prep, dosimetry...
- acute toxicity
- long-term/repeated dose long term effects: what is the importance of studying long term effects?
- What is the optimal design for repeated dose toxicity studies? (overload, appropriate length of studies including post exposure)
- Specific endpoints (genotoxicity, mutagenicity, carcinogenicity, ...)
- How to deal with surface modifications of NMs in safety assessment?
- How to describe ENM dosages in order to make comparison between studies possible: metrics
- When is extrapolation between (dosages of) NMs allowed?

## 6- Risk assessment, read-across, grouping, modelling (e.g. QSARs)

- How can in vitro be used in weight of evidence / intelligent testing
- Read across
  - Can data from bulk material of the same chemical composition be used for the assessment for the nanomaterial?
  - What kind of information can be used for extrapolation to other size ranges of the NMs of the same chemical composition?
- Can NMs be grouped based on "classes/groups" on the basis of composition, morphology, physical-chemical data, functionalisation?
- Or are there key phys-chem properties or other that can be identified as "hazard" indicators allowing to testing and classification strategies?
- Can nanomaterials be grouped on the basis of (known, presumed) mechanisms of toxicity?



# 7- Risk management strategies

- no-effect levels
- Measures to cope with lack of information on hazard potential
- Exposure elimination/minimization

## 8- Wider context:

- Other assessment tools: LCA...: Does LCA differ for NMs compared to 'regular' chemicals?
- Do we need to be concerned about disposal and recycling? Is there evidence that waste needs to be treated with special care?