



Engineered nanomaterial mechanisms of interactions with living systems and the environment: a universal **framework for safe nanotechnology**

Interest & impacts for industry and service providers



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Promethian Particles
Formulating solutions with nanoparticles

VITROCELL



Nano4Imaging



biomax
biomax.informatics.org

NovaMechanics



Project ID



NanoMILE in numbers	
Start date:	1 st March 2013
Duration	48 months
Budget:	13 M€
EC contribution:	9.6 M€
No. of partners	28 (2 US)

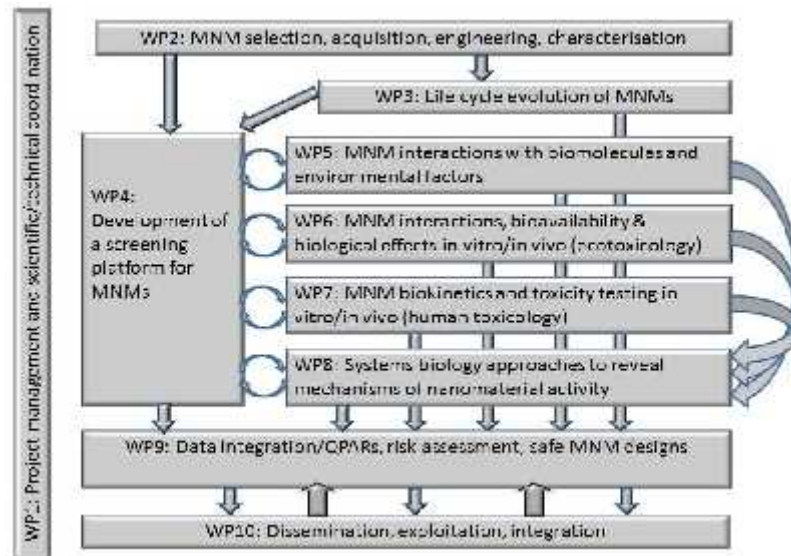


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Aim: to establish fundamental understanding of **mechanisms of MNM interactions with living systems and the environment**, across the **entire life cycle** of MNMs and in a wide range of target species.

Output: A **framework for classification of MNMs according to their impacts**, whether biological or environmental:

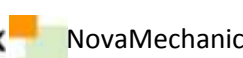
- **Protocols**
- **Data** : structure, fate, toxicity, etc. : **Open**
- **Models**: QSAR/QPAR
- **Guidance**



Ex. of exploitable outputs



Expected exploitable output	Demonstrator	Stage
Methodological advances e.g. NanoSight titrator with case notes on specific applications	e.g. Assessment of MNM agglomeration under environmental conditions	R&D / demo
New model systems for toxicity / ecotoxicity	e.g. maternal transfer model, Adverse outcome pathways HT screening assays for MNM (cell-based, cell free)	R&D
Descriptors for grouping / classification of MNMs	e.g. algorithms & predictive models Ranking of existing MNMs by hazard / exposure Decision tool for cost-benefit analysis of MNMs	R&D
QSAR/QPAR tools	e.g. User-friendly software for QSARs/QPARS	R&D
Design rules for tailoring MNM impacts	e.g. novel MNMs as Reference Materials MNM libraries etc.	R&D / demo
Integrated datasets on controlled human exposure & comparison to models of increasing complexity	e.g. database & web interface Data mining tools	R&D





Impact for MNM industry

(MNM manufacturers & users in products/processes)

For core business	On context	On tools
<ul style="list-style-type: none"> - Safer MNMs / Products - Help replacement of unsuitable MNMs / Products - Safer sites (emissions) - Demonstration of safety of MNMs / products 	<ul style="list-style-type: none"> - Stabilized regulation (REACH, GHS, ...) - Public confidence on impact of new MNM → Safer activity → More sustainable economic development 	<ul style="list-style-type: none"> - New protocols for own or external labs - New equipment for own labs - New OSH rules + Protocols for NM synthesis

How: from NanoMILE's results to your use:

- R&D: Integrate knowledge in your tools and policy: mechanisms, data,...
- Direct use of NanoMILE's tools & services *(see below)*
- Request integration by your service providers (labs, Risk assessments,...)



Impact for Lab “industry”



Labs - Instrument manufacturers

For core business	On context	On tools
<ul style="list-style-type: none"> - More accurate and significant tests - New equipment 	<ul style="list-style-type: none"> - Stabilized tests & essays (REACH, GHS, ...) → More sustainable economic development 	<ul style="list-style-type: none"> - New protocols - New equipment - New OSH rules

How: from NanoMILE’s results to your use:

- Integrate new protocols in your offer
- Labs: purchase equipment developed with nanoMILE

(see below)



Impact for risk assessment consultants



For core business	On context	On tools
- More accurate and significant methods & tools	- Stabilized methods and data (standards, REACH, ...) → More sustainable economic development	-

How: from NanoMILE’s results to your use:

- Development: Integrate knowledge in your tools & offer: mechanisms, data,...
- Direct use of NanoMILE’s tools & services *(see below)*



Ex. of Tools and services developed with NanoMILE

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NovaMechanics

Enalos InSilicoNano Platform

- Design and virtual screening of nanoparticles
- Freely available online

Prediction of MNPs Uptake in PaCa2 Cancer Cells

Design a Molecule attached to MNP

Enter SMILES separated by newlines

Select a Model: QNAR_PaCa2 Submit Reset

Import an SDF file (.sdf)

Browse... No file selected.

Select a Model: QNAR_PaCa2 Submit Reset

Name	Description
QNAR_PaCa2	QNAR model correlating chemical descriptors and MNP cellular uptakes (similar nanoparticle core with different surface modifiers)

Ex. of Tools and services developed with NanoMILE



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Automated exposure station at the air/liquid interface

- Exposure to airborne substances on cells
- Simulates human exposure
- 6, 12 or 24 wells
- Up to 18 cell culture compartments for exposure
- Up to 3 compartments for clean air control



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Promethan Particles
Formulating solutions with nanoparticles









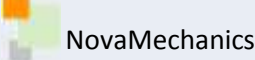



NovaMechanics



NanoMile private partners



Sector	Partner	Role in NanoMILE
NM manufacturers	  	<ul style="list-style-type: none"> • Provision of NMs for assessment • Bespoke synthesis of NMs with systematically varied properties • NMs for imaging applications
Instrument manufacturers	 	<ul style="list-style-type: none"> • Instrument development • Assay development / higher throughput
Tox / ecotox assessment	 	<ul style="list-style-type: none"> • Assay development & testing • Novel cellular platform for in vitro testing
Data management	 	<ul style="list-style-type: none"> • Database / knowledge management • QSARs and predictive models
Consulting (+ insurance, energy)		<ul style="list-style-type: none"> • Standardisation activities • Exploitation planning & management

For more, visit www.nanomile.eu or write to nanoMILE@eu-vri.eu!



Acknowledgement



This project has received funding from the European Union's Seventh Framework Programme for research, technological development and demonstration under grant agreement no 310451.

