Nanoparticles for medical purposes – Technical, medical and ethical aspects
Results from the ELSI work package of the NanoDiaRA project

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Ethical problems of nanomedical issues can be illustrated along the several stages of a nanoparticles lifetime. From the idea and design, followed by synthesis processes and investigations on the particles properties, to the industrial fabrication, marketing and application, finally ending in aspects of disposal and long term implications, each stage bears its own challenge.

Accompanying the entire process:
• Technology assessment
• Risk assessment & evaluation
• Ethical vision assessment
Questions on mid term and long term implications of the nanomedical product/method should be addressed in advance and require detailed and clear regulation and policies in order to avoid an upcoming distrust in and rejection of nanomedicine due to uncertainty and worries.

Business ethics
• Profit seeking vs. Product safety
The goal to increase the profit can lead to a lack of facility safety and to a too quick market release of not enough investigated products.
• Responsibility of companies, CEOs
Profit chase and economical thinking should have a lower priority than the patient’s need for product safety and reliability.

Long term Implications
• Contamination of → Body
It must be studied where the particles remain, if they cause damage or - after solving an “old” problem – produce a new one.
→ Environment
Can the nanomaterials leave the organism and be set free into the environment where they endanger the natural balance or contaminate water and food?

A Nanoparticle’s lifetime

Idea Design Plan
Research Synthesis Investigation
Industry Marketing Sale
Application Use Exposure
Disposal Remain Decay

Generally valid concerns
(to be addressed before),
e.g. Naturalness
The unnaturalness reproach undeniably is a frequent ingredient of public moral debates. It is doubtful, however, whether making an argument from naturalness part of the attempt to master moral conflicts on nanomedicine is plausible.

Research phase
• Responsibility of researchers
Researchers in nanomedicine should be able to follow and participate in the anticipative deliberation of moral problems caused by their research.
• Safety & Toxicology
NPs often display different chemical, physical, and biological characteristics from those of the bulk form of the same substance, highlighting the need for specific nano-policies.

Application phase
• Medical ethics
The critical philosophical reflection demands an accurate differentiation of the multiple scopes pursued with nanomedicine and should relate to a use- and purpose-centred structuring while addressing questions of justice.
• Strategies for dealing with public concerns
Ignoring, Marketing, Educating, Engaging

Summary: Most ethical and social problems going along with Nanomedicine are not new. Special aspects mainly arise from the application-oriented nature of this emerging research field.