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Toxikologische und pharmakologische Aspekte zu Nanopartikeln

Tierversuchsfreie Methoden für die toxikologische Prüfung von Nanopartikeln

Dr. Robert Landsiedel
BASF SE, Ludwigshafen

A decision-making framework for the grouping and testing of nanomaterials (DF4nanoGrouping)

Authors: Josje H.E. Arts, Mackenzie Hadi, Muhammad-Adeel Irfan, Athena M. Keene, Reinhard Kreiling, Delina Lyon, Monika Maier, Karin Michel, Thomas Petry, Ursula G. Sauer, David Warheit, Karin Wiench, Wendel Wohlleben and Robert Landsiedel

Abstract: The European Centre for Ecotoxicology and Toxicology of Chemicals (ECETOC) ‘Nano Task Force’ proposes a Decision-making framework for the grouping and testing of nanomaterials (DF4nanoGrouping) that consists of 3 tiers to assign nanomaterials to 4 main groups, to perform sub-grouping within the main groups and to determine and refine specific information needs. The DF4nanoGrouping covers all relevant aspects of a nanomaterial’s life cycle and biological pathways, i.e. intrinsic material and system-dependent properties, biopersistence, uptake and biodistribution, cellular and apical toxic effects. Use (including manufacture), release and route of exposure are applied as ‘qualifiers’ within the DF4nanoGrouping to determine if, e.g. nanomaterials cannot be released from a product matrix, which may justify the waiving of testing. The four main groups encompass (1) soluble nanomaterials, (2) biopersistent high aspect ratio nanomaterials, (3) passive nanomaterials, and (4) active nanomaterials. The DF4nanoGrouping aims to group nanomaterials by their specific mode-of-action that results in an apical toxic effect. This is eventually directed by a nanomaterial’s intrinsic properties. However, since the exact correlation of intrinsic material properties and apical toxic effect is not yet established, the DF4nanoGrouping uses the ‘functionality’ of nanomaterials for grouping rather than relying on intrinsic material properties alone. Such functionalities include system-dependent material properties (such as dissolution rate in biologically relevant media), bio-physical interactions, in vitro effects and release and exposure. The DF4nanoGrouping is a hazard and risk assessment tool that applies modern toxicology and contributes to the sustainable development of nanotechnological products. It ensures that no studies are performed that do not provide crucial data and therefore saves animals and resources.

Reference:

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