

J. Heyder / GSF, München

Dosimetry of Inhaled Ultrafine Particles

The dosimetry of ultrafine particles is determined by the deposition of the particles in the respiratory system, by the deposition of the particles from the site of deposition, by the translocation of the particles into respiratory tissues and via the circulation into the entire body and, finally, by the dose metric linking particle characteristics and biological responses.

Deposition: Ultrafine particles are solely deposited by diffusion. In the size range 50 - 100 nm deposition occurs solely in the alveolar region, Smaller particles are also deposited in bronchioles. Deposition is decreased when particles with hydrophilic surfaces are inhaled.

Clearance: Particles deposited in bronchioles are rapidly taken up by epithelium (80% of deposited 30 nm particles). Particles deposited in the alveoli can penetrate into the circulation. The classical clearance routes, mucociliary clearance and phagocytosis by macrophages, are of minor importance.

Dose Metric: The current understanding of ultrafine particle dosimetry favours the surface areas of particles as appropriate dose metric. These surface areas are the true surface areas and not any equivalent values used in aerosol physics.

[back to index](#)