

Sex-specific approach in nanomaterial hazard identification

Francesca Maranghi, Centre for Gender Medicine – ISS

Toxicological data on nanomaterials relevant for human exposure are now available to perform a reliable hazard identification although indications on the potential sex-specificity of their effects are often neglected. The experimental design of in vivo studies should include the treatment and observation of animal of both sexes, taking into account not only the potential alterations recorded in reproductive systems but also effects in other body districts significantly expressed in one sex only.

The following examples described results of in vivo studies which tested three different nanomaterials, using different experimental designs: i) titanium dioxide in short-term oral exposure in rats, ii) synthetic amorphous silica in 90-day repeated-dose oral exposure in rats, and iii) colloidal silver nanoparticles in short-term oral exposure in mice. All the tested NPs were relevant for human health and the experimental protocols involved rodents of both sexes. In all the studies, the recorded data were also evaluated in order to identify target organs and mechanisms showing enhanced susceptibility of male or female rodents to the test materials. The data provided useful tool for a sound and specific hazard identification of nanoparticles.