

RESEARCH REPORT - No. 1005 FY 2010-2012

Title of research project	Development of method for toxicokinetic evaluation of nanomaterials and sub-nanomaterials following oral administration for safety evaluation
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【Abstract】

With the recent development of nanotechnology, not only nanomaterials (NM \leq 100 nm) which have been widely utilized, but also sub-nanomaterials (sNM \leq 10 nm) have also been established and applied in foods. However, the increasing use of NM and sNM has raised concerns over their safety for human health, because their unique biokinetics is not fully understood. On the other hand, the information about their in vivo kinetics has been insufficient for ensuring the safety. Here, we developed the method for the evaluation of kinetics of NM and sNM. In addition, we investigated the biokinetics of nanosilica particles, sub-nano silver and sub-nano platinum, which are widely used in food additives and supplements. For example, we showed that sub-nano platinum with diameter of 1 nm (snPt1) were absorbed from the intestine, on the other hand, snPt8 were hardly absorbed. These results suggested that the borderline associated with biokinetics could exist in between 1 nm and 8 nm in diameter. These data could provide information to ensure the safety of NM and sNM. Further study of detailed mechanisms why such little differences of size affect intestinal absorption and blood retentivity is needed, however, we believe that our study also provide critical information for the need of safety evaluation of NM and sNM.