In this study, the high sensitive ICP-MS was employed to detect the contents of titanium and copper in liver, lung, spleen, kidney, heart, testis, brain and blood after administering an acute dose of different nano particle sizes of titanium and copper to rats by a syringe via gastrointestinal tract. In coupling with pathological examinations, the target organs of nano- and micro-copper were successfully determined. Biodistribution experiment showed that TiO2 mainly retained in the liver, spleen, kidneys, and lung tissues, which indicated that TiO2 particles could be transported to other tissues and organs after uptake by gastrointestinal tract. Moreover, the target organs of copper nano particles of different sizes after administrating a dose of 100 mg/kg were kidney, liver and blood. Liver is the main damaged organ.