Engineered gold nanoparticles (AuNPs) are introduced into a growing number of commercial products. Hence there is an increasing need to understand the effects of their eventual release into different environmental compartments and the species within. Eventually allowing for appropriate classification and licensing. Up to date the ecotoxicological risk for non target organisms is sparsely documented, with the focus predominantly on the acute toxicity of magnified expectable environmental concentrations. Thus in this laboratory-based study the marine bivalve Ruditapes philippinarum was chosen as a model to evaluate uptake, elimination and sub-cellular effects of citrate reduced AuNPs (20-30 nm) at an environmental relevant concentration (0.75 µg L⁻¹) over 14 days. Digestive gland and gill tissue was sampled periodically (Day 0, 1, 7 and 14), in order to record the changes in the expression of the chosen endpoints over time. Au concentrations and biomarkers of i.) oxidative stress (Catalase, GST, SOD, GPx, Gpx-Se), ii.) damage (Lipid Peroxidation, DNA strand breaks) and iii.) exposure (Metallothionein, AChE) were quantified. Our results identify an uptake of AuNPs in both organs and an effect on the activity of the tested enzymes, with the digestive gland being the primary target organ. However at the tested concentration the particles did not cause significant oxidative damage. Furthermore we could demonstrate a significant elimination of Au from the digestive track within a 7 day purification period, with excretion being an important pathway.