WE310 Molecular mechanism and physicochemical properties of Cadmium-TiO2 nanoparticle mixtures when co-exposed to the nematode Caenorhabditis elegans  L. Kleene, Hamburg University of Applied Sciences (HAW) / Life Sciences; A. Hurthouse, University of the West of Scotland / School of Science; S. Heise, Hamburg University of Applied Sciences / Life Sciences. The number of engineered nanomaterials (ENM) is rising continuously in consumer products and industrial fields. Therefore, knowledge about their ecotoxicity in aquatic and soil systems is very important but rare. Nanoscale titanium dioxide (nTiO₂) is probably among the most relevant ENMs with a projected accumulation rate in European river sediments of 1.4 mg*kg⁻¹*yr⁻¹ (Gottschalk et al., 2009). Investigations of Angelstorf et al. (2014) have shown that nTiO₂ is far more toxic to the nematode Caenorhabditis elegans than bulk TiO₂, especially under simulated solar radiation (SSR), probably a consequence of its photocatalytic property. Further experiments by Samet (2017) focused on the interaction of nTiO₂ with cadmium (Cd), another environmental contaminant. C. elegans was exposed to nTiO₂ (P25, primary particle size of 21 nm) and Cd in single and co-exposure for 72 h under dark conditions and SSR. Choosing growth and reproduction as toxic endpoints, co-exposure with 40 mg*L⁻¹ nTiO₂ and 50 µg*L⁻¹ Cd under SSR led to a synergistic inhibitory effect of 80 % of reproduction, twice as high compared to nTiO₂ alone. As Cd is known to induce intracellular calcium signaling as part of protective cell processes (Thévenod, 2009), in the study presented here, the effect of the mixture on intracellular calcium release will be investigated applying the following methods: 1) The molecular mechanism of nTiO₂ and Cd will be investigated with NS8593, a known human TRPM7 ion channel blocker. Because of high reproduction inhibition, the TRPM-like channel gene gon-2 could interact with the mixture. Gon-2 is responsible for gonadal cell division in C. elegans. If Cd is a Ca-channel-blocker, the combination of nTiO₂ and NS8593 should show the same effects under SSR. 2) The mode of action of nTiO₂-Cd-agglomerates is still not identified. They could interact if Cd is bound to nTiO₂ or if Cd and nTiO₂ are in close proximity. The impact of nTiO₂-Cd-agglomerates will be examined using calcium as a potential competitive ligand. 3) The photocatalytic activity of nTiO₂ could damage cell membranes under SSR and Cd could enter the cell. Measurements of membrane integrity with propidiumiodid and hexokinase will be tested. First results will be presented. Angelstorf et. al., 2014. Environ. Toxicol. Chem., 33, 2288-2296. Gottschalk et. al., 2009. Environ. Sci. Technol., 43, 9216-9222. Samet, Abstract SETAC Brussels 2017. Thévenod 2009. Toxicol. Appl. Pharmacol., 238, 221-39.