

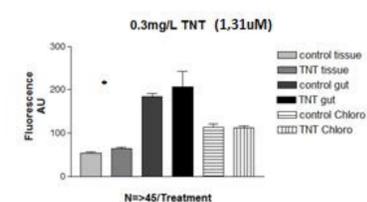
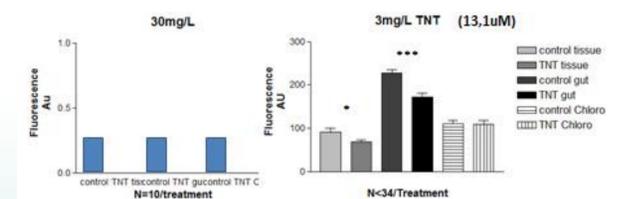
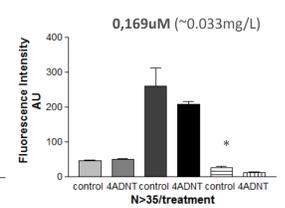
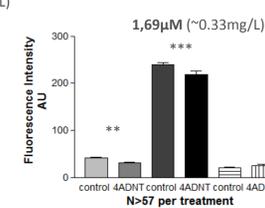
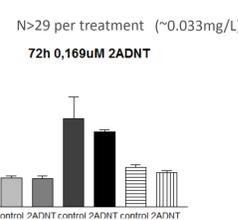
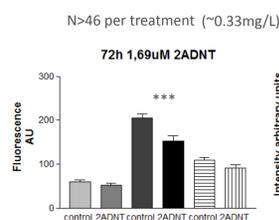
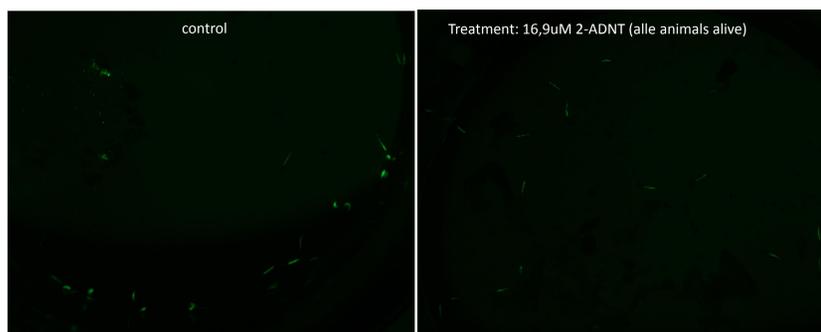
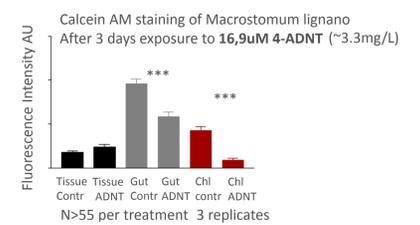
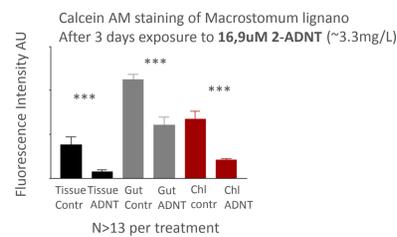
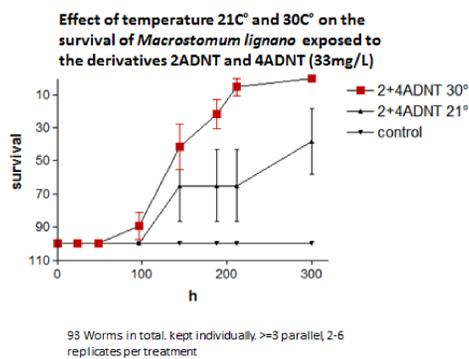
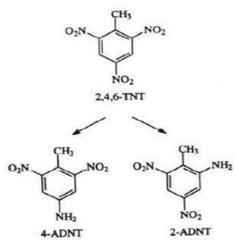
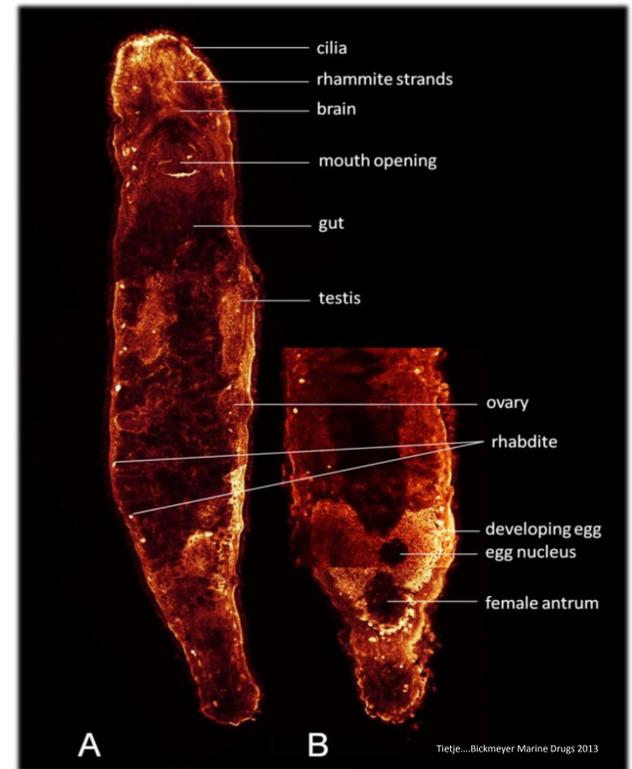
Fluorescence measurements of the marine flatworm *Macrostomum lignano* during exposure to the TNT derivatives 2ADNT and 4ADNT

Ulf Bickmeyer, Ina Meinen, Stefanie Meyer, Matthias Brenner

Section Ecological Chemistry, Alfred-Wegener-Institut Helmholtz Zentrum für Polar- und Meeresforschung, Am Handelshafen 12, D-27570 Bremerhaven

The most significant explosive of conventional munition dumped in the sea is 2,4,6-trinitrotoluene (TNT). Two main metabolites of TNT are 2-amino-4,6-dinitrotoluene (2ADNT) and 4-amino-2,6-dinitrotoluene (4ADNT). The toxicity of both compounds was tested on the marine flatworm *Macrostomum lignano* raised in the laboratory. The tested concentrations of both derivatives were in the μM to the nM range. In addition, the influence of temperature and UV-radiation was determined. By increasing the temperature to 30°C, the toxicity of both derivatives was strongly increased.

Using sub-lethal concentrations detoxifying defense mechanisms of exposed worms, namely drug and xenobiotic transporters, expelling toxic compounds from the cytosol were strongly enhanced. Also measurements of auto-fluorescence of exposed flatworms showed distinct alterations.



Temperature and time are the major factors for the toxicity of 2-ADNT and 4-ADNT

Using sub-lethal concentrations, the cellular concentration of a reporter dye (Calcein AM) was strongly reduced demonstrating the increased defense mechanisms of exposed worms, namely drug and xenobiotic transporters, expelling the reporter dye calcein from the cytosol. Feeding was suppressed by 2-ADNT and 4-ADNT and therefore the uptake of compounds measured by chlorophyll fluorescence in the gut. Effective concentrations of 2-ADNT and 4-ADNT used are found in similar concentrations in caged mussels on the sea floor (Strehse et al. Toxicology 2017)