Several hundred thousand tons of munitions containing chemical warfare agents (CWA) have been dumped in the seas after the World Wars. The release of CWA from corroding shells into the water is going to peak in the next decades, posing an immense threat to aquatic organisms.

CWA (and especially the most toxic, arsenic based CWA) could negatively affect economically important fishes such as Atlantic cod, which, given their ecology, often forage in the vicinity of CWA deposited at the bottom of the sea.

The molecular mechanism of CWA toxicity in fish has already been studied, however, so far no studies have investigated the effects of CWA on basic life history parameters of fish, such as the individual growth rate and mortality rate.

Based on previous studies concerning the effects of CWA on bacteria, as well as the preliminary results obtained for this project, it can be expected that the presence of CWA in the water disturbs the balance in microbial communities present in the digestive tracts of fish (and therefore, may further impair their condition), however, this hypothesis has yet to be verified.

This project aims to investigate if the CWA dumped in various sites in the Baltic Sea could disturb the microbial balance in the digestive tracts of the local Atlantic cod, as well as to investigate the effects of short and long term exposure to arsenic based CWA on the life history and microbial communities in the digestive tracts of captive Atlantic cod and *Danio rerio* (a model organism for ecotoxicological studies), as well as *Danio rerio* embryos.

We expect the cod collected from CWA dumping sites to have an unbalanced microbial composition and more frequent inflammation in their digestive tracts compared to cod collected from control sites, as well as the fishes exposed to CWA to have a decreased individual growth rate, an increased mortality rate, as well as an unbalanced microbial composition and more frequent inflammation in their digestive tracts compared to fishes from control treatments.

The results of the research described in this proposal could provide several new insights for marine biology and ecotoxicology. More specifically, our results could provide:
(1) Quantification of the effects of CWA present in the surrounding water on the condition (concerning individual growth rate and intestinal health) of an economically important fish species (Atlantic cod).
(2) Quantification of the effects of CWA present in the surrounding water on the mortality rate of fish embryos.
(3) Identification whether the presence of CWA in the surrounding water disturbs the balance in the microbial communities and leads to inflammation in the digestive tracts of fish. This finding might provide a proof for the existence of a novel mechanism of an indirect effect of CWA on the condition of fish.