

Silver nanoparticles inhibit gill sodium transport in juvenile rainbow trout (*Oncorhynchus mykiss*).

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Silver is a potent inhibitor of Na^+ transport in fish and is suggested to elicit its effects at the gill by inhibiting Na^+,K^+ -ATPase and/or carbonic anhydrase activity. This study sought to investigate if silver nanoparticles (NPs) or free dissociating Ag^+ from the NP's affect Na^+ transport in rainbow trout (*Oncorhynchus mykiss*). Silver NPs were dialyzed in water to examine the dissolution rate and calculate background of free Ag^+ released from the NPs. Fish were exposed to 1.0 mg l^{-1} citrate-capped silver NPs, dialyzed citrate-capped NPs, PVP and BSA-capped silver NP, or 10 μg l^{-1} and 0.02 μg l^{-1} silver (as AgNO_3). Silver NPs significantly inhibited Na^+ influx by over 50 %, but had no affect on Na^+ efflux. Na^+,K^+ -ATPase and carbonic anhydrase activity were measured to determine if the reduction in Na^+ uptake is associated with an inhibition of these branchial enzymes. This study is the first to show that ion regulation is disrupted by silver NPs.