

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 10µg l⁻¹ and 0.02 µg l⁻¹ silver (as AgNO₃). 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.