



Nanotoxicology. 2016 Jun;10(5):513-20. doi: 10.3109/17435390.2015.1078854. Epub 2015 Nov 2.

Repeated dose (28-day) administration of silver nanoparticles of varied size and coating does not significantly alter the indigenous murine gut microbiome.

Wilding LA¹, Bassis CM², Walacavage K¹, Hashway S¹, Leroueil PR³, Morishita M⁴, Maynard AD^{4,5}, Philbert MA^{4,6}, Bergin IL¹.

Author information

Abstract

Silver nanoparticles (AgNPs) have been used as antimicrobials in a number of applications, including topical wound dressings and coatings for consumer products and biomedical devices. Ingestion is a relevant route of exposure for AgNPs, whether occurring unintentionally via Ag dissolution from consumer products, or intentionally from dietary supplements. AgNP have also been proposed as substitutes for antibiotics in animal feeds. While oral antibiotics are known to have significant effects on gut bacteria, the antimicrobial effects of ingested AgNPs on the indigenous microbiome or on gut pathogens are unknown. In addition, AgNP size and coating have been postulated as significantly influential towards their biochemical properties and the influence of these properties on antimicrobial efficacy is unknown. We evaluated murine gut microbial communities using culture-independent sequencing of 16S rRNA gene fragments following 28 days of repeated oral dosing of well-characterized AgNPs of two different sizes (20 and 110 nm) and coatings (PVP and Citrate). Irrespective of size or coating, oral administration of AgNPs at 10 mg/kg body weight/day did not alter the membership, structure or diversity of the murine gut microbiome. Thus, in contrast to effects of broad-spectrum

antibiotics, repeat dosing of AgNP, at doses equivalent to 2000 times the oral reference dose and 100-400 times the effective in vitro anti-microbial concentration, does not affect the indigenous murine gut microbiome.

KEYWORDS: Antibiotics; in vivo; metastats; microbiome; mothur; mouse; nanomaterials; pyrosequencing; toxicology

PMID: 26525505 [PubMed - in process]

LinkOut - more resources



PubMed Commons

[PubMed Commons home](#)

0 comments

[How to join PubMed Commons](#)