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Toxicity of silver ions, metallic silver, and silver nanoparticle materials after *in vivo* dermal and mucosal surface exposure: A review

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Toxicity of silver ions, metallic silver, and silver nanoparticle materials 1 after in vivo dermal and mucosal surface exposure: a review 2 Niels Hadrup^a*, Anoop K. Sharma^b and Katrin Loeschner^c 3 4 5 ^aNational Research Centre for the Working Environment, DK-2100 Copenhagen, Denmark, Telephone +4539165214, Email address: nih@nfa.dk; bDivision for Risk Assessment and Nutrition, National Food 6 7 Institute, Technical University of Denmark, Søborg, Denmark, Email address: aksha@food.dtu.dk; ^cDivision 8 for Food Technology, National Food Institute, Technical University of Denmark, Søborg, Denmark, Email 9 address: kals@food.dtu.dk 10 11 Corresponding author* 12 13 Article type: Review 14 15 **Word counts:** Abstract: 178 16 17 **Text:** 7037 References: 4548 18 19 Highlights 20 21 1. Silver is an ingredient in certain dermal and mucosal medical applications 22 2. Silver can deposit in the body as particles causing a discoloration called argyria 23 3. Silver is observed to have a low potential for skin irritation. Eye irritation and allergic contact dermatitis 24 have been reported

4. Silver may cause genotoxicity, but additional data on its carcinogenic potential are required

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