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In vitro antifungal activity of silver nanoparticles against ocular pathogenic filamentous fungi.

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Abstract

PURPOSE: Fungal keratitis is emerging as a major cause of vision loss in a developing country such as China because of higher incidence and the unavailability of effective antifungals. It is urgent to explore broad-spectrum antifungals to effectively suppress ocular fungal pathogens, and to develop new antifungal eye drops to combat this vision-threatening infection. The aim of this study is to investigate the antifungal activity of **silver** nanoparticles (nano-Ag) in comparison with that of natamycin against ocular pathogenic filamentous fungi in vitro.

METHODS: Susceptibility tests were performed against 216 strains of fungi isolated from patients with fungal keratitis from the Henan Eye Institute in China by broth dilution antifungal susceptibility test of filamentous fungi approved by the Clinical and Laboratory Standards Institute M38-A document. The isolates included 112 Fusarium isolates (82 Fusarium solani species complex, 20 Fusarium verticillioides species complex, and 10 Fusarium oxysporum species complex), 94 Aspergillus isolates (61 Aspergillus flavus species complex, 11 Aspergillus fumigatus species complex, 12 Aspergillus versicolor species complex, and 10 Aspergillus niger species complex), and 10 Alternaria alternata isolates. The minimum inhibitory concentration (MIC) range and mode, the MIC for 50% of the strains tested (MIC50 value), and the MIC90

value were provided for the isolates with the SPSS statistical package.

RESULTS: MIC50 value of nano-Ag were 1, 0.5, and 0.5 μg/mL for Fusarium spp., Aspergillus spp., and Al. alternata, respectively. MIC90 values of nano-Ag were 1, 1, and 1 μg/mL for Fusarium spp., Aspergillus spp., and Al. alternata, respectively. MIC50 values of natamycin were 4, 32, and 4 μg/mL for Fusarium spp., Aspergillus spp., and Al. alternata, respectively. MIC90 values of natamycin were 8, 32, and 4 μg/mL for Fusarium spp., Aspergillus spp., and Al. alternata, respectively.

CONCLUSIONS: Nano-Ag, relative to natamycin, exhibits potent in vitro activity against ocular pathogenic filamentous fungi.

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