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Varying Susceptibility of Corneal and Environmental Strains of *Acanthamoebae* to Multipurpose Solutions using a Novel Method

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Abstract

Purpose: A novel method has been developed to compare *Acanthamoeba* strain differences by testing their susceptibility to multipurpose contact lens cleaning solutions (MPS). **Methods:** This method uses surface attached protozoa that mimic cells attached to a contact lens. In brief, acanthamoebae were grown on non nutrient agar plates with *E. coli* prey. Blocks of agar with cysts or trophs (ca. 50 cells) were cut out and transferred to MPS (ReNu, Complete, and Opti-free) for up to 24 h treatment. After neutralizing in Dey Engley Broth (Difco), blocks were washed in amoeba saline and reinoculated onto fresh prey bacteria. Positive growth was indicative of survival.

Results: Testing showed that the efficacy of the 3 MPS was different. ReNu was the most effective, followed by Opti-free while Complete was relatively ineffective. Not surprisingly, trophozoites were more susceptible than cysts. Overall strain differences are summarized in the table.

Conclusions: Findings for individual MPS complement previous work with other methods. This study has also identified that environmental strains vary in their sensitivity to disinfecting solutions. Overall, T3, T5 and T11 environmental isolates were more resistant than the T4 isolates from the cornea and beach. This resilience supports previous

work on temperature tolerance, where T3 and T5 acanthamoebae survived up to 41 C. Investigators should consider the strain genotype and its source before embarking on sensitivity testing.

% Survival of Acanthamoebae

Genotype and Source	Troph		Cyst	
	0-6 hr	24 hr	0-6 hr	24 hr
T3, tapwater, Hong Kong	94	100	100	100
T4, Corneal Scrape (P6)	50	44	83	44
T4, dry sand, FL	44	0	50	22
T4, Troon beach, UK	89	100	100	100
T4, Wet Sand, FL	44	11	94	56
T4, Wet Sand, FL	67	78	100	100
T5, Soil, FL	100	100	100	89
T5, tapwater, FL	100	33	100	100
T5, dry sand, FL	100	100	100	100
T11, soil, FL	44	22	100	89

Key Words: Acanthamoeba • contact lens • pathobiology