Early Adhesion of *Candida albicans* onto Dental Acrylic Surfaces

Abstract

Denture-associated stomatitis is a common candidal infection that may give rise to painful oral symptoms, as well as be a reservoir for infection at other sites of the body. As poly (methyl methacrylate) (PMMA) remains the main material employed in the fabrication of dentures, the aim of this research was to evaluate the adhesion of *Candida albicans* cells onto PMMA surfaces by employing an atomic force microscopy (AFM) single-cell force spectroscopy (SCFS) technique. For experiments, tipless AFM cantilevers were functionalized with PMMA microspheres and probed against *C. albicans* cells immobilized onto biopolymer-coated substrates. Both a laboratory strain and a clinical isolate of *C. albicans*were used for SCFS experiments. Scanning electron microscopy (SEM) and AFM imaging of *C. albicans* confirmed the polymorphic behavior of both strains, which was dependent on growth culture conditions. AFM force-spectroscopy results showed that the adhesion of *C. albicans* to PMMA is morphology dependent, as hyphal tubes had increased adhesion compared with yeast cells ($P < 0.05$). *C. albicans* budding mother cells were found to be nonadherent, which contrasts with the increased adhesion observed in the tube region. Comparison between strains demonstrated increased adhesion forces for a clinical isolate compared with the lab strain. The clinical isolate also had increased survival in blood and reduced sensitivity to complement opsonization, providing additional evidence of strain-dependent differences in *Candida*-host interactions that may affect virulence. In conclusion, PMMA-modified AFM probes have shown to be a reliable technique to characterize the adhesion of *C. albicans* to acrylic surfaces.