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February 13, 2001 (provided by AvantGuard's Manufacturer)

Avant & AvantGuard Bonded Polymer Pipette Tip Validation

Objective: To compare the performance of Avant & AvantGuard Low Binding Bonded Polymer Pipette Tips against conventional and low retention tips. Liquid handling accuracy and precision are crucial to success in today's molecular biology laboratories, especially for DNA analysis and protein handling. A significant culprit of pipette inaccuracy is binding of sample. The Avant & AvantGuard Low Binding Bonded Polymer Tip reduces binding, thus increasing sample delivery accuracy.

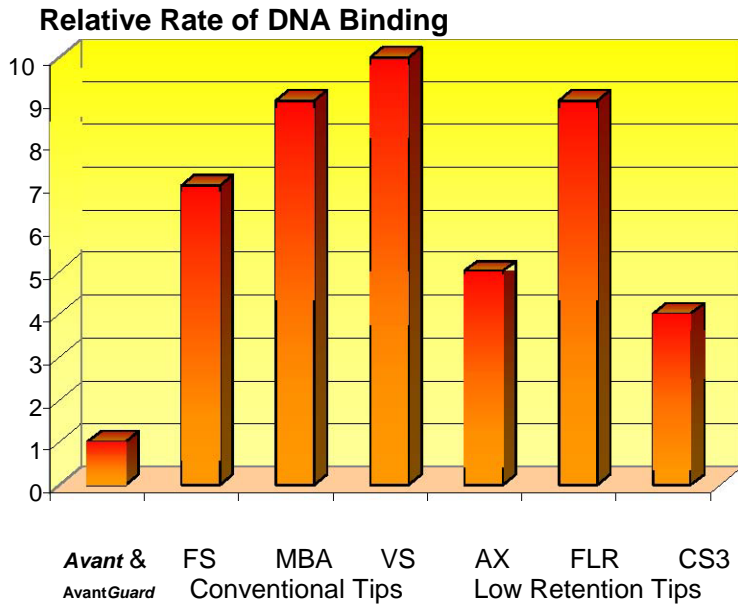
Materials & Methods: DNA Binding: DNA binding of six other tips was compared to the Bonded Polymer Tip by handling ABI Big Dye Terminator Ready Reaction Mix (Applied Biosystems, Foster City, CA). Ready reaction mix contains DNA and is of similar viscosity as enzymatic solutions. Testing was conducted at an independent laboratory in a blind manner to eliminate bias in pipetting technique.

For each tip tested, 100ul of Ready Reaction Mix was aspirated and then dispensed slowly. Special care was taken to ensure the tip was not inserted deep into the liquid to minimize the amount of solution on the outside of the tip. The tip was then washed in 625ul ddH₂O in a spectrophotometer sample tube by aspirating and dispensing 100ul in the water three times. The sample was vortexed for 3 seconds and analyzed on a DU-70 Spectrophotometer (Beckman-Coulter, Fullerton, CA) at 260nm wavelength. Blank controls were used to zero the instrument and were run in between each tip trial to check the spectrophotometer for consistency. Ten trials of each tip type underwent this analysis. The highest and lowest 260nm readings were eliminated for each tip and the remaining eight were averaged for a final 260nm result.

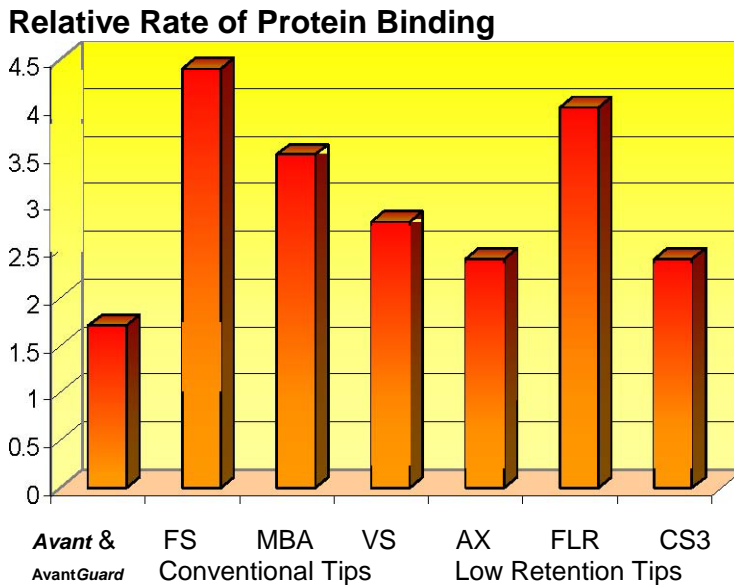
This test was repeated after autoclaving each tip type to show Avant & AvantGuard's Bonded Polymer technology is not compromised by autoclaving.

Protein Binding: The same test procedure was carried out using bovine serum albumin at 10 mg/ml (New England Biolabs, Beverly, MA). For each tip, 100ul of BSA was handled and the tip was then washed in 625ul of ddH₂O. The 280nm wavelength was used to evaluate the amount of protein bound by the tips. As with the DNA experiment, each tip was tested ten times and the test was repeated using autoclaved tips.

Results: DNA handling: The average 260nm readings are plotted in the graph below to show binding for each tip relative to zero binding. Avant & AvantGuard's Bonded Polymer pipette tips experience as much as a tenfold decrease in retained solution compared to conventional tips and a fourfold decrease from the best "low retention" tip. Furthermore, performance of Avant & AvantGuard's Bonded Polymer Tips is not compromised after autoclaving (data not shown).



For *protein handling*, the average 280nm readings are plotted in the graph below to show binding for each tip relative to zero binding. Avant & AvantGuard's Bonded Polymer pipette tips experience as much as a three-fold decrease in bound solution compared to conventional tips. Furthermore, performance is not compromised after autoclaving (data not shown).



Discussion: A pipette tip that binds sample compromises the high degree of accuracy and precision demanded by molecular biology laboratories. Conventional pipette tip manufacturers claim to produce low retention tips. This test demonstrates that some low retention tips perform no better than conventional tips. Bonded Polymer Technology incorporated in Avant & AvantGuard's Low Binding Tips significantly reduces the amount of DNA and protein bound by the tip. Furthermore, Avant & AvantGuard's Low Binding tips offer a marked improvement over the best low retention technologies.