

Supplementary File 1: Microsphere adherence to pipette tips validation

Introduction

Microspheres may be lost during the preparation and injection of the microsphere mixture. We investigated whether microspheres adhere to the pipette tips in various media to determine the optimal injection solution for the micro-embolism model.

Methods

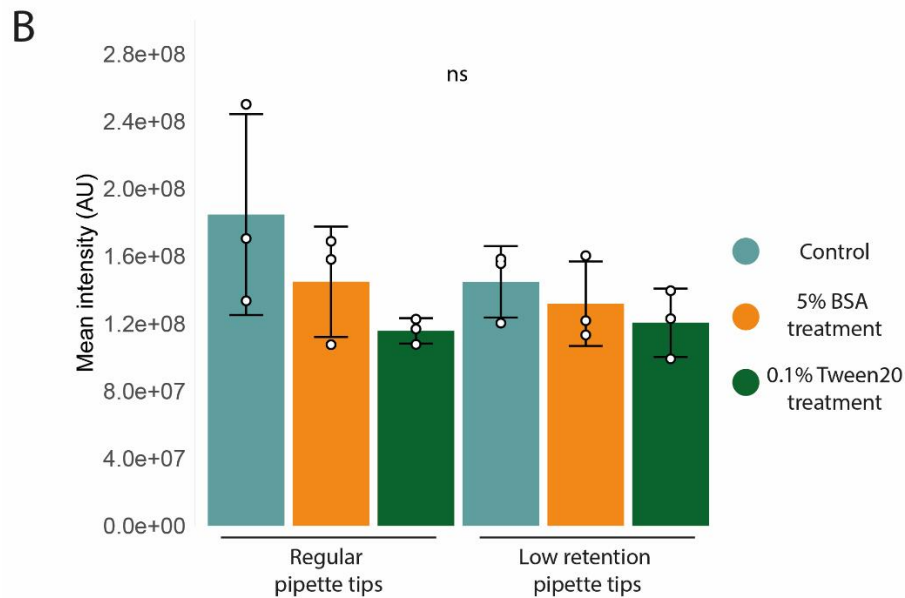
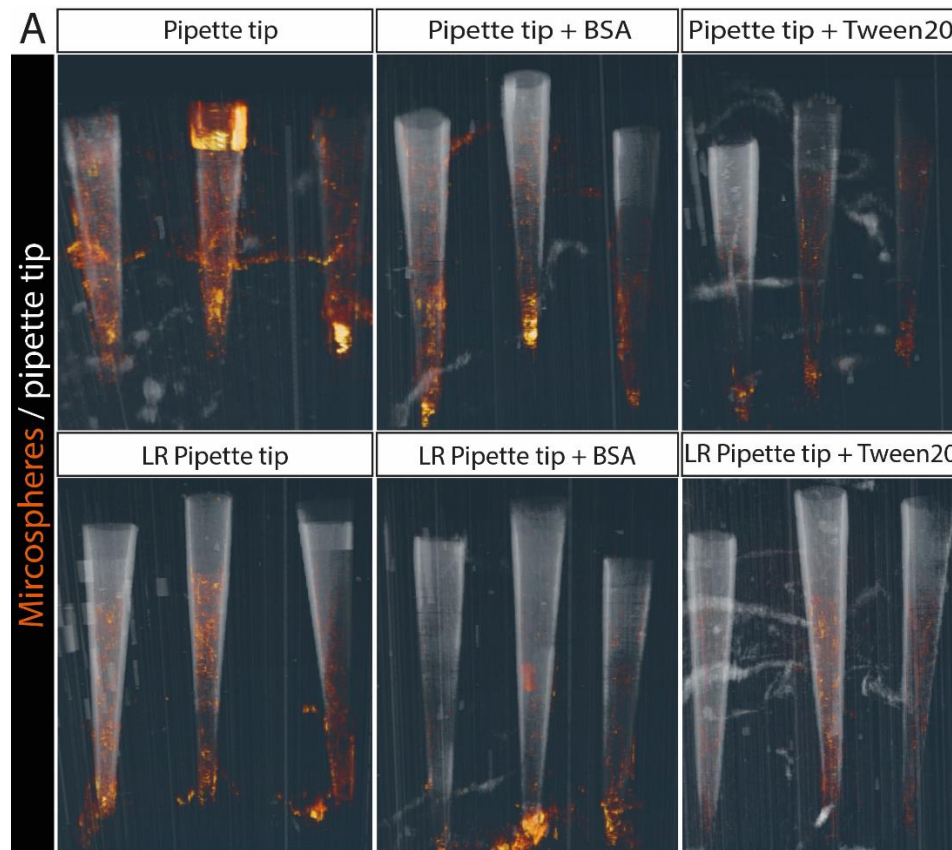
It was assessed whether microspheres adhere to the pipette tip using regular and low-retention (LR) pipette tips. The pipette tips were not pre-flushed or flushed/coated with either 5% BSA or 0.1% Tween20 solutions, after which we pipetted 20 μ l of 3.6×10^6 10 μ m microspheres per ml from the stock concentration into an empty container. The pipette tips were cut and imaged using the small-3D-FICS. The mean fluorescence intensity of the microspheres for the lower 14 mm of the pipette tips was measured (Supplementary Fig. 1A-B).

Results

Standard pipette tips without any coating showed substantial microsphere binding (Supplementary Fig.1A-B). Pre-flushing with 5% BSA reduced this adherence, with an even greater reduction observed using 0.1% Tween20. Low-retention (LR) pipette tips exhibited lower microsphere binding than standard tips across all conditions. Mean fluorescence measurements confirmed that LR tips retained fewer microspheres, particularly under uncoated and 5% BSA conditions. Both regular and LR tips treated with 0.1% Tween-20 showed the lowest fluorescence levels, indicating minimal microsphere adherence.

Conclusion

Microspheres are best prepared with either regular or LR pipette tips and 0.1% Tween20 solution.



Supplementary Figure 1: Validation of pipette tip microsphere adhesion. Adhesion of 10 μm microspheres to regular and low retention pipette tips, without pre-treatment or pre-treated with 5% BSA or 0.1% Tween20. A) Overview images of the pipette tips with adhered microspheres of all 6 conditions. B) Mean intensity values for six pipette tip conditions. Bars represent group means $\pm$ SD; individual points are shown. Statistical analysis (ANOVA with Tukey's test) revealed no significant differences between groups (all $p > 0.05$).