

References collected about mucus diffusion experiments. Those in bold were included in the meta-analysis.

1. **Abdulkarim, M., N. Agullo, B. Cattoz, P. Griffiths, A. Bernkop-Schnurch, S. Gomez Borros, and M. Gumbleton, “Nanoparticle diffusion within intestinal mucus: the impact of particle surface charge, size and heterogeneity across polyelectrolyte, pegylated and viral particles,” Eur. J. Pharm. Biopharm., 97:230–238, 2015.**
2. Arends, F., R. Baumgartel, and O. Lieleg, “Ion-specific effects modulate the diffusive mobility of colloids in extracellular matrix gel,” *Langmuir*, 29:15965–15973, 2013.
3. Barr, J. J., R. Auro, M. Furlan, K.L. Whiteson, M. L. Erb, J. Pogliano, A. Stotland, R. Wolkowicz, A. S. Cutting, K. S. Doran, P. Salamon, M. Youle, and F. Rohwer, “Bacteriophage adhering to mucus provide a non-host-derived immunity,” *Proc. Natl. Acad. Sci. U.S.A.*, 110:10771–10776, 2013.
4. **Barr, J. J., R. Auro, N. Sam-Soon, S. Kassegne, G. Peters, N. Bonilla, M. Hatay, S. Mourtada, B. Bailey, M. Youle, B. Felts, A. Baljon, J. Nulton, P. Salamon, and F. Rohwer, “Subdiffusive motion of bacteriophage in mucosal surfaces increases the frequency of bacterial encounters,” *Proc. Natl. Acad. Sci. U.S.A.*, 112:13675–13680, 2015.**
5. Celli, J. P., B. S. Turner, N. H. Afdhal, S. Keates, I. Ghiran, C. P. Kelly, R. H. Ewoldt, G. H. McKinley, P. So, S. Erramilli, and R. Bansila, “*Helicobacter pylori* moves through mucus by reducing the mucin viscoelasticity,” *Proc. Natl. Acad. Sci. U.S.A.*, 106:14321–14326, 2009.
6. Cone, R. Barrier properties of mucus. *Adv. Drug Deliv. Rev.*, 61:75–85, 2009.
7. Hansing, J., C. Ciemer, W. K. Kim, X. Zhang, J. E. DeRouchey, and R. R. Netz., “Nanoparticle filtering in charged hydrogels: Effects of particle size, charge asymmetry and salt concentration,” *Eur. Phys. J. E*, 39(5):53, 2016.
8. Krajina, B. A., C. Tropini, A. Zhu, P. DiGiacomo, J. L. Sonnenburg, S. C. Heilshorn, and A. J. Spakowitz, “Dynamic light scattering microrheology reveals multiscale viscoelasticity of polymer gels and precious biological materials.” *ACS Cent. Sci.*, 3(12), 1294-1303, 2017.
9. **Lai, S. K., D. E. O’Hanlon, S. Harrold, Y. Wang, S. Man, R. Cone, and J. Hanes, “Rapid transport of large polymeric nanoparticles in fresh undiluted human mucus,” *Proc. Natl. Acad. Sci. U.S.A.*, 104:1482–1487, 2007.**

10. Lai, S. K., K. Hida, S. Shukair, Y. Wang, A. Figueiredo, R. Cone, T. J. Hope, and J. Hanes, **“Human immunodeficiency virus type 1 is trapped by acidic but not neutralized human cervicovaginal mucus,”** *J. Virol*, **83**:11196–11200, 2009.
11. Li, L. D., T. Crouzier, A. Sarkar, L. Dunphy, J. Han, and K. Ribbeck, **“Spatial Configuration and Composition of Charge Modulates Transport into a Mucin Hydrogel Barrier,”** *Biophys. J.*, **105**:1357–1365, 2013.
12. Lieleg, O., I. Vladescu, and K. Ribbeck, **“Characterization of particle translocation through mucin hydrogels,”** *Biophys. J.*, **98**:1782–1789, 2010.
13. Olmsted, S. S., J. L. Padgett, A. I. Yudin, K. J. Whaley, T. R. Moench, and R. Cone, **“Diffusion of Macromolecules and Virus-Like Particles in Human Cervical Mucus,”** *Biophys. J.*, **81**:1930–1937, 2001.
14. Newby, J., J. L. Schiller, T. Wessler, J. Edelstein, M. G. Forest, and S. K. Lai, **“A blueprint for robust crosslinking of mobile species in biogels with weakly adhesive molecular anchors,”** *Nat. Commun.*, **8**(883), 2017.
15. Sigurdsson, H. H., J. Kirch, and C. Lehr, **“Mucus as a barrier to lipophilic drugs,”** *Int. J. Pharm.*, **453**:56–64, 2013.
16. Spagnolie, S, **“Complex fluids in biological systems experiment, theory and computation,”** Springer, New York, 2015.
17. Schuster, B. S., J. S. Suk, G. F. Woodworth, and J. Hanes, **“Nanoparticle diffusion in respiratory mucus from humans without lung disease,”** *Biomaterials*, **34**:3439–3446, 2013.
18. Suk, J. S., S. K. Lai, N. J. Boylan, M. R. Dawson, M. P. Boyle, and J. Hanes, **“Rapid transport of muco-inert nanoparticles in cystic fibrosis sputum treated with N-acetyl cysteine,”** *Nanomedicine (LOND)*, **6**:365–375, 2011.
19. Amsden, B. and N. Turner, **“Diffusion Characteristics of Calcium,”** *Biotechnol. Bioeng.*, **65**:605–610, 1999.
20. Wessler, T., S. A. McKinley, R. Cone, G. Forest, and S. K. Lai, **“Using computational modeling to optimize the design of antibodies that trap viruses in mucus,”** *ACS Infect. Dis.*, **2**:82–92, 2016.

21. Witten, J. and K. Ribbeck, "The particle in the spider's web: transport through biological hydrogels," *Nanoscale*, 9:8080–8095, 2017.
22. Wang, J., Y. Yang, M. Yu, G. Hu, Y. Gan, H. Gao, and X. Shi, "Diffusion of rod-like nanoparticles in non-adhesive and adhesive porous polymeric gels," *J Phys Chem Solids*, 112:431–457, 2018.
23. **Yildiz, H. M., C. A. McKelvey, P. J. Marsac, and R. L. Carrier. "Size selectivity of intestinal mucus to diffusing particulates is dependent on surface chemistry and exposure to lipids," *J. Drug Target.*, 23:768-774, 2015.**
24. Zhang, X., J. Hansing, R. R. Netz, and J. E. DeRouchey, "Particle transport through hydrogels is charge asymmetric," *Biophys. J.*, 208:530–539, 2015.