

REFERENCES

1. Ding, S., *Recent developments in ophthalmic drug delivery*. Pharmaceut Sci Tech Today, 1998. **1**(8): p. 328-35.
2. Kaur, I.P. and R. Smitha, *Penetration enhancers and ocular bioadhesives: two new avenues for ophthalmic drug delivery*. Drug Dev Ind Pharm, 2002. **28**(4): p. 353-69.
3. Le Bourlais, C., et al., *Ophthalmic drug delivery systems--Recent advances*. Prog Ret Eye Res, 1998. **17**(1): p. 33-58.
4. Shell, J.W., *Pharmacokinetics of topically applied ophthalmic drugs*. Surv Ophthalmol, 1982. **26**(4): p. 207-18.
5. Urtti, A. and L. Salminen, *Minimizing systemic absorption of topically administered ophthalmic drugs*. Surv Ophthalmol, 1993. **37**(6): p. 435-56.
6. Ludwig, A., *The use of mucoadhesive polymers in ocular drug delivery*. Adv Drug Deliv Rev, 2005. **57**(11): p. 1595-639.
7. Mannermaa, E., K.S. Vellonen, and A. Urtti, *Drug transport in corneal epithelium and blood-retina barrier: emerging role of transporters in ocular pharmacokinetics*. Adv Drug Deliv Rev, 2006. **58**(11): p. 1136-63.
8. Urtti, A., *Challenges and obstacles of ocular pharmacokinetics and drug delivery*. Adv Drug Deliv Rev, 2006. **58**(11): p. 1131-5.
9. Robert, P.Y. and J.P. Adenis, *Comparative review of topical ophthalmic antibacterial preparations*. Drugs, 2001. **61**(2): p. 175-85.
10. Ali, Y. and K. Lehmussaari, *Industrial perspective in ocular drug delivery*. Adv Drug Deliv Rev, 2006. **58**(11): p. 1258-68.
11. Laura, R.-G., et al., *Cationic Vectors in Ocular Drug Delivery*. J Drug Target, 2004. **12**: p. 623-33.
12. Schaefer, F., et al., *Bacterial keratitis: a prospective clinical and microbiological study*. Br J Ophthalmol, 2001. **85**(7): p. 842-7.
13. Callegan, M.C., R.J. O'Callaghan, and J.M. Hill, *Pharmacokinetic considerations in the treatment of bacterial keratitis*. Clin Pharmacokinet, 1994. **27**(2): p. 129-49.

14. Ghelardi, E., et al., *A mucoadhesive polymer extracted from tamarind seed improves the intraocular penetration and efficacy of rifloxacin in topical treatment of experimental bacterial keratitis*. *Antimicrob Agents Chemother*, 2004. **48**(9): p. 3396-401.
15. Ahmed, I., et al., *Physicochemical determinants of drug diffusion across the conjunctiva, sclera, and cornea*. *J Pharm Sci*, 1987. **76**(8): p. 583-6.
16. Alves, N.M. and J.F. Mano, *Chitosan derivatives obtained by chemical modifications for biomedical and environmental applications*. *Int J Biol Macromol*, 2008. **43**(5): p. 401-14.
17. Alonso, M.J. and A. Sanchez, *The potential of chitosan in ocular drug delivery*. *J Pharm Pharmacol*, 2003. **55**(11): p. 1451-63.
18. Lehr, C.-M., et al., *In vitro evaluation of mucoadhesive properties of chitosan and some other natural polymers*. *Int J Pharm*, 1992. **78**(1-3): p. 43-8.
19. Felt, O., et al., *Delivery of antibiotics to the eye using a positively charged polysaccharide as vehicle*. *AAPS PharmSci*, 2001. **3**(4): p. E34.
20. Felt, O., P. Buri, and R. Gurny, *Chitosan: a unique polysaccharide for drug delivery*. *Drug Dev Ind Pharm*, 1998. **24**(11): p. 979-93.
21. Felt, O., et al., *Chitosan as tear substitute: a wetting agent endowed with antimicrobial efficacy*. *J Ocul Pharmacol Ther*, 2000. **16**(3): p. 261-70.
22. Felt, O., et al., *Topical use of chitosan in ophthalmology: tolerance assessment and evaluation of precorneal retention*. *Int J Pharm*, 1999. **180**(2): p. 185-93.
23. Norn, M.S., *Tear fluid pH in normals, contact lens wearers, and pathological cases*. *Acta Ophthalmol (Copenh)*, 1988. **66**(5): p. 485-9.
24. Lundstrom, T.S. and J.D. Sobel, *Antibiotics for gram-positive bacterial infections: vancomycin, quinupristin-dalfopristin, linezolid, and daptomycin*. *Infect Dis Clin North Am*, 2004. **18**(3): p. 651-68.
25. Harris, C.M., H. Kopecka, and T.M. Harris, *The stabilization of vancomycin by peptidoglycan analogs*. *J Antibiot (Tokyo)*, 1985. **38**(1): p. 51-7.
26. Nieto, M. and H.R. Perkins, *Modifications of the acyl-D-alanyl-D-alanine terminus affecting complex-formation with vancomycin*. *Biochem J*, 1971. **123**(5): p. 789-803.

27. Katzung, B.G., *Basic & clinical pharmacology*. 10th ed. a LANGE medical book. 2007, Boston: McGraw Hill. xiv, 1,179.
28. Havener, W.H., *Ocular pharmacology*. 5th ed. 1983, St. Louis: Mosby. xii, 691.
29. Barna, J.C. and D.H. Williams, *The structure and mode of action of glycopeptide antibiotics of the vancomycin group*. *Annu Rev Microbiol*, 1984. **38**: p. 339-57.
30. Fleischer, A.B., et al., *Topical vancomycin formulation for methicillin-resistant Staphylococcus epidermidis blepharoconjunctivitis*. *Am J Ophthalmol*, 1986. **101**(3): p. 283-7.
31. Fuhrman, L.C.Jr and R.T. Stroman, *Stability of vancomycin in an extemporaneously compounded ophthalmic solution*. *Am J Health Syst Pharm*, 1998. **55**(13): p. 1386-8.
32. Steinert, R.F., *Current therapy for bacterial keratitis and bacterial conjunctivitis*. *Am J Ophthalmol*, 1991. **112**(4 Suppl): p. 10S-14S.
33. Reynolds, L.A. and R.G. Closson, *Extemporaneous ophthalmic preparations*. 1993, Vancouver, WA: Applied Therapeutics. xii, 335.
34. Nanjawade, B.K., F.V. Manvi, and A.S. Manjappa, *In situ-forming hydrogels for sustained ophthalmic drug delivery*. *J Control Release*, 2007. **122**(2): p. 119-34.
35. Ahmed, I. and T.F. Patton, *Importance of the noncorneal absorption route in topical ophthalmic drug delivery*. *Invest Ophthalmol Vis Sci*, 1985. **26**(4): p. 584-7.
36. Remington, J.P. and D.B. Troy, *Remington: the science and practice of pharmacy*. 21st ed. 2006, Philadelphia, PA.: Lippincott & Williams & Wilkins. xxii, 2393.
37. Haynes, R.J., P.J. Tighe, and H.S. Dua, *Antimicrobial defensin peptides of the human ocular surface*. *Br J Ophthalmol*, 1999. **83**(6): p. 737-41.
38. Kaur, I.P. and M. Kanwar, *Ocular preparations: the formulation approach*. *Drug Dev Ind Pharm*, 2002. **28**(5): p. 473-93.
39. Shell, J.W., *Ophthalmic drug delivery systems*. *Surv Ophthalmol*, 1984. **29**(2): p. 117-28.

40. Koevary, S.B., *Trends in the noncorneal delivery of drugs into the eye*. Arch Soc Esp Oftalmol, 2002. **77**(7): p. 347-9.
41. Romanelli, L., et al., *Ocular absorption and distribution of bendazac after topical administration to rabbits with different vehicles*. Life Sci, 1994. **54**(13): p. 877-85.
42. Vonwil, A., et al., *Bronchoconstrictive side effects of timolol eye drops in patients with obstructive lung disease*. Schweiz Med Wochenschr, 1981. **111**(19): p. 665-9.
43. Sahoo, S.K., F. Dilnawaz, and S. Krishnakumar, *Nanotechnology in ocular drug delivery*. Drug Discov Today, 2008. **13**(3-4): p. 144-51.
44. Zhang, G., et al., *Intraocular nanoparticle drug delivery: a pilot study using an aerosol during pars plana vitrectomy*. Invest Ophthalmol Vis Sci, 2007. **48**(11): p. 5243-9.
45. Budai, L., et al., *Gels and liposomes in optimized ocular drug delivery: studies on ciprofloxacin formulations*. Int J Pharm, 2007. **343**(1-2): p. 34-40.
46. Kleinmann, G., et al., *Collagen shields as a drug delivery system for the fourth-generation fluoroquinolones*. Ophthalmologica, 2007. **221**(1): p. 51-6.
47. Willoughby, C.E., M. Batterbury, and S.B. Kaye, *Collagen corneal shields*. Surv Ophthalmol, 2002. **47**(2): p. 174-82.
48. Taravella, M., P. Stepp, and D. Young, *Collagen shield delivery of tobramycin to the human eye*. CLAO J, 1998. **24**(3): p. 166-8.
49. Frangie, J.P., *Clinical pharmacokinetics of various topical ophthalmic delivery systems*. Clin Pharmacokinet, 1995. **29**(2): p. 130-8.
50. Rowe, R.C., P.J. Sheskey, and P.J. Weller, *Handbook of pharmaceutical excipients*. 4th ed. 2003, London: Pharmaceutical Press. xxii, 776.
51. Sarasam, A.R., et al., *Antibacterial activity of chitosan-based matrices on oral pathogens*. J Mater Sci Mater Med, 2008. **19**(3): p. 1083-90.
52. Chung, Y.C. and C.Y. Chen, *Antibacterial characteristics and activity of acid-soluble chitosan*. Bioresour Technol, 2008. **99**(8): p. 2806-14.
53. Du, L.Q., et al., *Effect of different biomedical membranes on alkali-burned cornea*. Ophthalmic Res, 2008. **40**(6): p. 282-90.

54. Yang, H., Y. Xiang, and X.N. Zhang, *Experimental study on the effects of chitosan on the conjunctiva scar formation and symblepharon*. Zhonghua Yan Ke Za Zhi, 2006. **42**(4): p. 313-7.
55. Sall, K.N., J.K. Kreter, and R.H. Keates, *The effect of chitosan on corneal wound healing*. Ann Ophthalmol, 1987. **19**(1): p. 31-3.
56. Gupta, H., et al., *Sustained ocular drug delivery from a temperature and pH triggered novel in situ gel system*. Drug Deliv, 2007. **14**(8): p. 507-15.
57. Diebold, Y., et al., *Ocular drug delivery by liposome-chitosan nanoparticle complexes (LCS-NP)*. Biomaterials, 2007. **28**(8): p. 1553-64.
58. Kao, H.J., et al., *Characterization of pilocarpine-loaded chitosan/Carbopol nanoparticles*. J Pharm Pharmacol, 2006. **58**(2): p. 179-86.
59. Genta, I., et al., *Bioadhesive microspheres for ophthalmic administration of acyclovir*. J Pharm Pharmacol, 1997. **49**(8): p. 737-42.
60. Di Colo, G., et al., *Effect of chitosan on in vitro release and ocular delivery of ofloxacin from erodible inserts based on poly(ethylene oxide)*. Int J Pharm, 2002. **248**(1-2): p. 115-22.
61. Badawi, A.A., et al., *Chitosan based nanocarriers for indomethacin ocular delivery*. Arch Pharm Res, 2008. **31**(8): p. 1040-9.
62. De Campos, A.M., A. Sanchez, and M.J. Alonso, *Chitosan nanoparticles: a new vehicle for the improvement of the delivery of drugs to the ocular surface. Application to cyclosporin A*. Int J Pharm, 2001. **224**(1-2): p. 159-68.
63. Hassan, E.E. and J.M. Gallo, *A simple rheological method for the in vitro assessment of mucin-polymer bioadhesive bond strength*. Pharm Res, 1990. **7**(5): p. 491-5.
64. Artursson, P., et al., *Effect of chitosan on the permeability of monolayers of intestinal epithelial cells (Caco-2)*. Pharm Res, 1994. **11**(9): p. 1358-61.
65. Prabakaran, M., *Review paper: chitosan derivatives as promising materials for controlled drug delivery*. J Biomater Appl, 2008. **23**(1): p. 5-36.
66. Wang, W. and D. Xu, *Viscosity and flow properties of concentrated solutions of chitosan with different degrees of deacetylation*. Int J Biol Macromol, 1994. **16**(3): p. 149-52.

67. Tananuwat, N. and M. Suwanniponth, *Microbial Keratitis in Thailand: A Survey of Common Practice Patterns*. J Med Assoc Thai, 2008. **91**(3): p. 316-22.
68. Tananuvat, N., S. Sienglew, and S. Ausayakhun, *Microbial Keratitis Leading to Admission at Maharaj Nakorn Chiang Mai Hospital*. Chiang Mai Med Bull, 2004. **43**(3): p. 93-103.
69. Jenchitr, W., *Country report of Thai prevention of blindness program*. Thai J Ophthalmol, 1996. **10**: p. 63-71.
70. Fechner, P.U. and K.D. Teichmann, *Ocular therapeutics: pharmacology and clinical application*. 1998, Thorofare, NJ.: SLACK Incorporated. xv, 656.
71. Hopkins, G. and R. Pearson, *Ophthalmic drugs: diagnostic and therapeutic uses*. 5th ed. 2007, Edinburgh: Butterworth Heinemann / Elsevier. vii, 331.
72. Maske, R., J.C. Hill, and S.P. Oliver, *Management of bacterial corneal ulcers*. Br J Ophthalmol, 1986. **70**(3): p. 199-201.
73. Jones, S., et al., *Ocular streptococcal infections*. Cornea, 1988. **7**(4): p. 295-9.
74. Crock, G.W., et al., *Gas gangrene infection of the eyes and orbits*. Br J Ophthalmol, 1985. **69**(2): p. 143-8.
75. Moore, J.E., et al., *Incidence of Pseudomonas aeruginosa in recreational and hydrotherapy pools*. Commun Dis Public Health, 2002. **5**(1): p. 23-6.
76. Mani, V.R. and K.C. Vidya, *A microbiological study of ophthalmia neonatorum in hospital-born babies*. J Indian Med Assoc, 1997. **95**(7): p. 416-7, 421.
77. O'Brien, T.P., et al., *Efficacy of ofloxacin vs cefazolin and tobramycin in the therapy for bacterial keratitis. Report from the Bacterial Keratitis Study Research Group*. Arch Ophthalmol, 1995. **113**(10): p. 1257-65.
78. McLeod, S.D., et al., *The importance of initial management in the treatment of severe infectious corneal ulcers*. Ophthalmology, 1995. **102**(12): p. 1943-8.
79. Liesegang, T.J., *Bacterial keratitis*. Infect Dis Clin North Am, 1992. **6**(4): p. 815-29.
80. Charlton, J.F., K.P. Dalla, and A. Kniska, *Storage of extemporaneously prepared ophthalmic antimicrobial solutions*. Am J Health Syst Pharm, 1998. **55**(5): p. 463-6.

81. Keay, L., et al., *Microbial keratitis predisposing factors and morbidity*. Ophthalmology, 2006. **113**(1): p. 109-16.
82. Gangopadhyay, N., et al., *Fluoroquinolone and fortified antibiotics for treating bacterial corneal ulcers*. Br J Ophthalmol, 2000. **84**(4): p. 378-84.
83. Smith, A., et al., *Fluoroquinolones: place in ocular therapy*. Drugs, 2001. **61**(6): p. 747-61.
84. Kenkel, J., *Analytical chemistry for technicians*. 3rd ed. 2003, Boca Raton: CRC Press. 554.
85. Stevens, M.P., *Polymer chemistry*. 1975, Reading, Mass.: Addison-Wesley. xv, 458.
86. Rathke, T.D. and S.M. Hudson, *Reviews of chitin and chitosan as fiber and film formers*. JMS Rev. Macromol. Chem. Phys, 1994(C34): p. 375-437.
87. Hayes, E. and D. Davies. *Characterization of chitosan. II: The determination of the degree of acetylation of chitosan and chitin in Proceedings of the First International Conference on Chitin/Chitosan; MIT Sea Grant Program*. 1978. Cambridge, MA.
88. Leesawat, P., et al., *Artificial Tear Formulation from Chitosan*. Chiang Mai J Sci, 2005. **32**(3): p. 501-5.
89. Lewandowski, R., et al., *Kinetics of antibiotics release from ceramic implants*. Polim Med, 2003. **33**(3): p. 3-11.
90. Vercaigne, L.M., et al., *Antibiotic-heparin lock: in vitro antibiotic stability combined with heparin in a central venous catheter*. Pharmacotherapy, 2000. **20**(4): p. 394-9.
91. Arici, M.K., et al., *In vitro potency and stability of fortified ophthalmic antibiotics*. Aust N Z J Ophthalmol, 1999. **27**(6): p. 426-30.
92. United States Pharmacopeial Convention, *First supplement to USP 30 - NF 25*. Asian edition. ed. 2007, Rockville, MD.: The Convention. p.3505-840.
93. CLSI, *Performance standards for antimicrobial susceptibility testing; fifteenth informational supplement*. 2005, Clinical and laboratory standards institute.
94. Alster, Y., et al., *Intraocular penetration of vancomycin eye drops after application to the medial canthus with closed lids*. Br J Ophthalmol, 2000. **84**(3): p. 300-2.

95. Usansky, J.I., A. Desai, and D. Tang-Liu. *PK Functions for Microsoft Excel*. cited; Available from: <http://www.boomer.org/pkin/soft.html>.
96. Khan, T.A., K.K. Peh, and H.S. Ch'ng, *Reporting degree of deacetylation values of chitosan: the influence of analytical methods*. J Pharm Pharm Sci, 2002. **5**(3): p. 205-12.
97. Li, Q., et al., *Applications and properties of chitosan*. J Bioact Compat Polym, 1992. **7**: p. 370-97.
98. Aranaz, I., et al., *Functional characterization of chitin and chitosan*. Curr Chem Biol, 2009. **3**: p. 203-30.
99. Khangtragool, A., et al., *Stability of chitosan solutions for potential use in ocular drug delivery*. CMU. J. Nat. Sci, 2008. **7**(2): p. 209-17.
100. Fuhrman, L., et al., *Stability of vancomycin in an extemporaneously compounded ophthalmic solution*. Am J Health-Syst, 1998. **55**(13): p. 1386-88.
101. Ali, Y. and K. Lehmusaaari, *Industrial perspective in ocular drug delivery*. Adv Drug Deliv Rev, 2006. **58**(11): p. 1258-68.
102. Mitra, A.K., *Ophthalmic drug delivery systems*. Drugs and the pharmaceutical sciences. 1993, New York: Marcel Dekker. 502.
103. Prakongpan, S., *Drug stability (in Thai)*. 1997: Faculty of Pharmacy, Mahidol University, Thailand.
104. Il'ina, A.V. and V.P. Varlamov, *Hydrolysis of chitosan in lactic acid*. Prikl Biokhim Mikrobiol, 2004. **40**(3): p. 354-8.
105. Harvard, R.N., *Degradation of ethyl cellulose in solution*. J. Polym. Sci, 1950. **5**(5): p. 635-6.
106. Arias, C., et al., *Intrinsic viscosity calculated out of single point measurements for chondroitin-4-sulfate and chondroitin-6-sulfate solutions*. Biophys Chem, 1998. **72**: p. 307-12.
107. Biskup, R.C., W.P. Anna, S. Julian, H. Artur, U. Piotr, and M.R. Janusz., *Aqueous solutions of hydrochloric acid as simple solvents of chitosan for viscosity and light scattering-based molecular weight determination*. Polish Chitin Society, Monograph XII, 2007: p. 87-94.

108. Varum, K.M., M.H. Ottoy, and O. Smidsrod, *Acid hydrolysis of chitosans*. Carbohydrate Polymers, 2001. **46**(1): p. 89-98.
109. Lund, W., Royal Pharmaceutical Society of Great Britain, *The pharmaceutical codex: principles and practice of pharmaceuticals*. 12th ed. 1994, Singapore: Info Access. xix, 1117 p. ill.
110. Le Ray, A.-M., et al., *Vancomycin encapsulation in biodegradable poly(-caprolactone) microparticles for bone implantation. Influence of the formulation process on size, drug loading, in vitro release and cytocompatibility*. Biomaterials, 2002. **24**(3): p. 443-49.
111. Trissel, L.A., *Handbook on injectable drugs*. 14th ed. 2007, Bethesda, MD.: American Society of Health-System Pharmacists. XVII, 1720 p.
112. Trissel, L.A., *Handbook on injectable drugs*. 11th ed. 2001, Bethesda, MD.: American Society of Health-System Pharmacists. 1432 p.
113. Johnson, M.E. and P.J. Murphy, *Changes in the tear film and ocular surface from dry eye syndrome*. Prog Ret Eye Res, 2004. **23**(4): p. 449-74.
114. Murphy, C.C., et al., *Pharmacokinetics of vancomycin following intracameral bolus injection in patients undergoing phacoemulsification cataract surgery*. Br J Ophthalmol, 2007. **91**(10): p. 1350-3.
115. Ferro, J.F., et al., *Postoperative contamination after using vancomycin and gentamicin during phacoemulsification*. Arch Ophthalmol, 1997. **115**(2): p. 165-70.
116. Pflugfelder, S.C., et al., *Intravitreal vancomycin. Retinal toxicity, clearance, and interaction with gentamicin*. Arch Ophthalmol, 1987. **105**(6): p. 831-7.
117. Huerva, V., et al., *Levels of vancomycin in aqueous humor after topical eye drops administration*. J Ocul Pharmacol, 1993. **9**(2): p. 167-70.
118. Bourlais, C.L., et al., *Ophthalmic drug delivery systems--recent advances*. Prog Retin Eye Res, 1998. **17**(1): p. 33-58.
119. Robinson, J. and G. Mlynek, *Bioadhesive and phase-change polymers for ocular drug delivery*. Adv Drug Deliv Rev, 1995. **16**: p. 45-50.
120. Rabinovich-Guilattab, L., et al., *Cationic Vectors in Ocular Drug Delivery*. J Drug Target, 2004. **12**(9-10): p. 623-33.

121. Singla, A.K. and M. Chawla, *Chitosan: some pharmaceutical and biological aspects--an update*. J Pharm Pharmacol, 2001. **53**(8): p. 1047-67.



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