

DAFTAR PUSTAKA

- Abbas, Muhammad N, Saeed A Khan, Sajid K Sadozai, Islam A Khalil, Asem Anter, Marwa E Fouly, Ahmed H Osman, and Mohsin Kazi. 2022. "Nanoparticles Loaded Thermoresponsive In Situ Gel for Ocular Antibiotic Delivery against Bacterial Keratitis." *Polymers* 14(6): 1135. doi:10.3390/polym14061135.
- Abdelbary, Ghada A, Maha M Amin, and Mohamed Y Zakaria. 2017. "Ocular Ketoconazole-Loaded Proniosomal Gels: Formulation, Ex Vivo Corneal Permeation and in Vivo Studies." *Drug delivery* 24(1): 309–19. doi:10.1080/10717544.2016.1247928.
- Abdellatif, Menna M, Islam A Khalil, Yara E Elakkad, Hesham A Eliwa, Tamer M Samir, and Asmaa K Al-Mokaddem. 2020. "Formulation and Characterization of Sertaconazole Nitrate Mucoadhesive Liposomes for Vaginal Candidiasis." *International journal of nanomedicine* 15: 4079–90. doi:10.2147/IJN.S250960.
- Ahmed, Bakr, Srishty Jaiswal, Srishti Naryal, Rohan M Shah, Raid G Alany, and Indu Pal Kaur. 2024. "In Situ Gelling Systems for Ocular Drug Delivery." *Journal of Controlled Release* 371: 67–84. doi:https://doi.org/10.1016/j.jconrel.2024.05.031.
- Ahmed, Sadek, Maha M Amin, Sarah Mohamed El-Korany, and Sinar Sayed. 2022. "Pronounced Capping Effect of Olaminosomes as Nanostructured Platforms in Ocular Candidiasis Management." *Drug delivery* 29(1): 2945–58. doi:10.1080/10717544.2022.2120926.
- Ahmed, Sadek, Maha M Amin, and Sinar Sayed. 2023. "Ocular Drug Delivery: A Comprehensive Review." *AAPS PharmSciTech* 24(2): 66. doi:10.1208/s12249-023-02516-9.
- Aisyah, Andi Nur, Andi Dian Permana, Elly Wahyudin, Diany Elim, Ikbai Ikbai, Nana Novriana, Payung Datu, et al. 2024. "Formulation and Evaluation of Dissolving Microneedle for Transdermal Delivery of Piperine: The Effect of Polymers Concentration." *Journal of Biomaterials Science, Polymer Edition* 0(0): 1–20. doi:10.1080/09205063.2024.2320948.
- Akgun, Zeynep, and Ozlem Barut Selver. 2023. "Epidemiology and Etiology of Chemical Ocular Injury: A Brief Review." *World journal of clinical cases* 11(6): 1245–51. doi:10.12998/wjcc.v11.i6.1245.
- Akhter, Md Habban, Irfan Ahmad, Mohammad Y Alshahrani, Alhanouf I Al-Harbi, Habibullah Khalilullah, Obaid Afzal, Abdulmalik S A Altamimi, et al. 2022. "Drug Delivery Challenges and Current Progress in Nanocarrier-Based Ocular Therapeutic System." *Gels (Basel, Switzerland)* 8(2). doi:10.3390/gels8020082.
- Anjani, Qonita Kurnia, Juan Domínguez-Robles, Emilia Utomo, María Font, María Cristina Martínez-Ohárriz, Andi Dian Permana, Álvaro Cárcamo-Martínez, Eneko Larrañeta, and Ryan F Donnelly. 2021. "Inclusion Complexes of Rifampicin with Native and Derivatized Cyclodextrins: In Silico Modeling, Formulation, and Characterization." *Pharmaceuticals (Basel, Switzerland)* 15(1). doi:10.3390/ph15010020.
- Atta, Sarah, Chandrashan Perera, Regis P Kowalski, and Vishal Jhanji. 2022. "Fungal

- Keratitis: Clinical Features, Risk Factors, Treatment, and Outcomes.” *Journal of Fungi* 8(9): 962. doi:10.3390/jof8090962.
- Awad, Ramy, Alaa Atef Ghaith, Khaled Awad, Marina Mamdouh Saad, and Ahmed Ak Elmassry. 2024. “Fungal Keratitis: Diagnosis, Management, and Recent Advances.” *Clinical ophthalmology (Auckland, N.Z.)* 18: 85–106. doi:10.2147/OPTH.S447138.
- Aziz, Anugerah Yaumil Ramadhani, Nurul Afia Hasir, Nurul Bahari Putri Imran, Muhammad Firdaus Hamdan, Ulfah Mahfufah, Nurfadilla Wafiah, Andi Arjuna, Rifka Nurul Utami, and Andi Dian Permana. 2023. “Development of Hydrogel-Forming Microneedles for Transdermal Delivery of Albendazole from Liquid Reservoir.” *Journal of Biomaterials Science, Polymer Edition* 34(8): 1101–20. doi:10.1080/09205063.2022.2157671.
- Bawa, Priya, Viness Pillay, Yahya E Choonara, and Lisa C du Toit. 2009. “Stimuli-Responsive Polymers and Their Applications in Drug Delivery.” *Biomedical materials (Bristol, England)* 4(2): 22001. doi:10.1088/1748-6041/4/2/022001.
- Begum, Ghazala, Thomas Leigh, Ella Courtie, Richard Moakes, Gibran Butt, Zubair Ahmed, Saaeha Rauz, Ann Logan, and Richard J Blanch. 2020. “Rapid Assessment of Ocular Drug Delivery in a Novel Ex Vivo Corneal Model.” *Scientific Reports* 10(1): 11754. doi:10.1038/s41598-020-68254-1.
- Bhatnagar, Shubhmita, Amala Saju, Krishna Deepthi Cheerla, Sudeep Kumar Gade, Prashant Garg, and Venkata Vamsi Krishna Venuganti. 2018. “Corneal Delivery of Besifloxacin Using Rapidly Dissolving Polymeric Microneedles.” *Drug delivery and translational research* 8(3): 473–83. doi:10.1007/s13346-017-0470-8.
- Boddupalli, Bindu M, Zulkar N K Mohammed, Ravinder A Nath, and David Banji. 2010. “Mucoadhesive Drug Delivery System: An Overview.” *Journal of advanced pharmaceutical technology & research* 1(4): 381–87. doi:10.4103/0110-5558.76436.
- Bodratti, Andrew M, and Paschalis Alexandridis. 2018. “Formulation of Poloxamers for Drug Delivery.” *Journal of Functional Biomaterials* 9(1): 11. doi:10.3390/jfb9010011.
- Brambilla, Elisa, Silvia Locarno, Salvatore Gallo, Francesco Orsini, Carolina Pini, Marco Farronato, Douglas V Thomaz, et al. 2022. “Poloxamer-Based Hydrogel as Drug Delivery System: How Polymeric Excipients Influence the Chemical-Physical Properties.” *Polymers* 14(17): 3624. doi:10.3390/polym14173624.
- Brewster, Marcus E, and Thorsteinn Loftsson. 2007. “Cyclodextrins as Pharmaceutical Solubilizers.” *Advanced Drug Delivery Reviews* 59(7): 645–66. doi:https://doi.org/10.1016/j.addr.2007.05.012.
- Brown, Lottie, Astrid K. Leck, Michael Gichangi, Matthew J. Burton, and David W. Denning. 2021. “The Global Incidence and Diagnosis of Fungal Keratitis.” *The Lancet Infectious Diseases* 21(3): e49–57. doi:10.1016/S1473-3099(20)30448-5.
- Butt, Sania Safdar, Yasmin Badshah, Maria Shabbir, and Mehak Rafiq. 2020. “Molecular Docking Using Chimera and Autodock Vina Software for Nonbioinformaticians.” *JMIR Bioinformatics and Biotechnology* 1(1): e14232. doi:10.2196/14232.
- Casey-Power, Saoirse, Richie Ryan, Gautam Behl, Peter McLoughlin, Mark E Byrne, and Laurence Fitzhenry. 2022. “Hyaluronic Acid: Its Versatile Use in Ocular Drug

- Delivery with a Specific Focus on Hyaluronic Acid-Based Polyelectrolyte Complexes." *Pharmaceutics* 14(7). doi:10.3390/pharmaceutics14071479.
- Chaiwut, Chutima, Sarin Tadtong, Puriputt Akachaipabul, Jutamas Jiaranaikulwanitch, Sudarshan Singh, Siriporn Okonogi, Dwi Marlina Syukri, and Chuda Chittasupho. 2025. "Thermosensitive In Situ Ophthalmic Gel for Effective Local Delivery and Antifungal Activity of Ketoconazole Nanoparticles." *Gels* 11(1). doi:10.3390/gels11010013.
- Chaudhari, Pinal, Ranjitha Naik, Lakshmi Sruthi Mallela, Sanhita Roy, Sumit Birangal, Vivek Ghate, Sarojini Balladka Kunhanna, and Shaila A Lewis. 2022. "A Supramolecular Thermosensitive Gel of Ketoconazole for Ocular Applications: In Silico, in Vitro, and Ex Vivo Studies." *International Journal of Pharmaceutics* 613: 121409. doi:https://doi.org/10.1016/j.ijpharm.2021.121409.
- Chen, I-Cheng, Chen-Ying Su, Pei-Yu Chen, The C Hoang, Yi-Syue Tsou, and Hsu-Wei Fang. 2022. "Investigation and Characterization of Factors Affecting Rheological Properties of Poloxamer-Based Thermo-Sensitive Hydrogel." *Polymers* 14(24): 5353. doi:10.3390/polym14245353.
- Cirello, Amanda L, Jennifer L Dumouchel, Mithat Gunduz, Christine E Dunne, and Upendra A Argikar. 2017. "In Vitro Ocular Metabolism and Bioactivation of Ketoconazole in Rat, Rabbit and Human." *Drug Metabolism and Pharmacokinetics* 32(2): 121–26. doi:https://doi.org/10.1016/j.dmpk.2016.11.001.
- Conde Penedo, Andrea, Victoria Díaz Tomé, Anxo Fernández Ferreiro, Miguel González Barcia, and Francisco J Otero Espinar. 2021. "Enhancement in Corneal Permeability of Riboflavin Using Cyclodextrin Derivates Complexes as a Previous Step to Transepithelial Cross-Linking." *European journal of pharmaceutics and biopharmaceutics: official journal of Arbeitsgemeinschaft fur Pharmazeutische Verfahrenstechnik e.V* 162: 12–22. doi:10.1016/j.ejpb.2021.02.012.
- DelMonte, Derek W, and Terry Kim. 2011. "Anatomy and Physiology of the Cornea." *Journal of cataract and refractive surgery* 37(3): 588–98. doi:10.1016/j.jcrs.2010.12.037.
- Dewan, Mitali, Arpita Adhikari, Rathin Jana, and Dipankar Chattopadhyay. 2023. "Development, Evaluation and Recent Progress of Ocular in Situ Gelling Drug Delivery Vehicle Based on Poloxamer 407." *Journal of Drug Delivery Science and Technology* 88: 104885. doi:https://doi.org/10.1016/j.jddst.2023.104885.
- Drouhet, E, and B Dupont. 1983. "Laboratory and Clinical Assessment of Ketoconazole in Deep-Seated Mycoses." *The American journal of medicine* 74(1B): 30–47. doi:10.1016/0002-9343(83)90512-0.
- Dua, Harminder S, Darren Shu Jeng Ting, Ahmed Al Saadi, and Dalia G Said. 2020. "Chemical Eye Injury: Pathophysiology, Assessment and Management." *Eye (London, England)* 34(11): 2001–19. doi:10.1038/s41433-020-1026-6.
- Elim, Diany, Andi Maqhfirah Nurul Fitri, Muhammad Alif Sya ban Mahfud, Nur Afika, Nurul Aisha Fitri Sultan, Hijrah, Rangga Meidianto Asri, and Andi Dian Permana. 2023. "Hydrogel Forming Microneedle-Mediated Transdermal Delivery of Sildenafil Citrate from Polyethylene Glycol Reservoir: An Ex Vivo Proof of Concept Study." *Colloids and Surfaces B: Biointerfaces* 222(November 2022): 113018. doi:10.1016/j.colsurfb.2022.113018.

- Faizi, Hafsa Shahid, Muhammad Iqbal Nasiri, Yu Wu, Deepakkumar Mishra, Ryan F Donnelly, Muhammad Usman Minhas, Lalitkumar K Vora, and Raghu Raj Singh Thakur. 2024. "Deferasirox Nanosuspension Loaded Dissolving Microneedles for Ocular Drug Delivery." *International journal of pharmaceutics* 664: 124614. doi:10.1016/j.ijpharm.2024.124614.
- Felton, Timothy, Peter F Troke, and William W Hope. 2014. "Tissue Penetration of Antifungal Agents." *Clinical microbiology reviews* 27(1): 68–88. doi:10.1128/CMR.00046-13.
- Gaballa, Sherif A, Omar H El Garhy, Hossam Moharram, and Hamdy Abdelkader. 2020. "Preparation and Evaluation of Cubosomes/Cubosomal Gels for Ocular Delivery of Beclomethasone Dipropionate for Management of Uveitis." *Pharmaceutical Research* 37(10): 198. doi:10.1007/s11095-020-02857-1.
- Gadziński, Piotr, Anna Froelich, Monika Wojtyłko, Antoni Bialek, Julia Krysztofiak, and Tomasz Osmalek. 2022. "Microneedle-Based Ocular Drug Delivery Systems - Recent Advances and Challenges." *Beilstein journal of nanotechnology* 13: 1167–84. doi:10.3762/bjnano.13.98.
- Garg, Prashant, Venkata Vamsi Krishna Venuganti, Aravind Roy, and Girdhari Roy. 2019. "Novel Drug Delivery Methods for the Treatment of Keratitis: Moving Away from Surgical Intervention." *Expert opinion on drug delivery* 16(12): 1381–91. doi:10.1080/17425247.2019.1690451.
- Gaudana, Ripal, J Jwala, Sai H S Boddu, and Ashim K Mitra. 2009. "Recent Perspectives in Ocular Drug Delivery." *Pharmaceutical research* 26(5): 1197–1216. doi:10.1007/s11095-008-9694-0.
- Ghannoum, M A, and L B Rice. 1999. "Antifungal Agents: Mode of Action, Mechanisms of Resistance, and Correlation of These Mechanisms with Bacterial Resistance." *Clinical microbiology reviews* 12(4): 501–17. doi:10.1128/CMR.12.4.501.
- Glover, Katie, Deepakkumar Mishra, Shilpkala Gade, Lalitkumar K Vora, Yu Wu, Alejandro J Paredes, Ryan F Donnelly, and Thakur Raghu Raj Singh. 2023. "Microneedles for Advanced Ocular Drug Delivery." *Advanced Drug Delivery Reviews* 201: 115082. doi:https://doi.org/10.1016/j.addr.2023.115082.
- Gupta, Bharti, Varsha Mishra, Sankalp Gharat, Munira Momin, and Abdelwahab Omri. 2021. "Cellulosic Polymers for Enhancing Drug Bioavailability in Ocular Drug Delivery Systems." *Pharmaceuticals (Basel, Switzerland)* 14(11). doi:10.3390/ph14111201.
- Harron, Dean. 2009. "Technical Requirements for Registration of Pharmaceuticals for Human Use: The ICH Process." In , 522–33. doi:10.1002/9781444317800.ch21.
- Hoffman, Jeremy J., Simon Arunga, Abeer H.A. Mohamed Ahmed, Victor H. Hu, and Matthew J. Burton. 2022. "Management of Filamentous Fungal Keratitis: A Pragmatic Approach." *Journal of Fungi* 8(10). doi:10.3390/jof8101067.
- Hu, Jie, Di Zhang, Shuli Chen, Xin Wang, Zhiyun Zheng, Shuangying Gui, and Ning He. 2025. "Minimally Invasive Treatment of Fungal Keratitis with Voriconazole Microneedle Corneal Patch." *European journal of pharmaceutics and biopharmaceutics: official journal of Arbeitsgemeinschaft fur Pharmazeutische Verfahrenstechnik e.V* 211: 114717. doi:10.1016/j.ejpb.2025.114717.

- Interagency Coordinating Committee on the Validation of Alternative Methods (ICCVAM). 2010. "Recommended Test Method Protocol : Hen ' s Egg Test – Chorioallantoic Membrane (HET-CAM) Test Method." *ICCVAM Test Method Evaluation Report* 13(10): B30–38.
- Jambhekar, Sunil S, and Philip Breen. 2016. "Cyclodextrins in Pharmaceutical Formulations II: Solubilization, Binding Constant, and Complexation Efficiency." *Drug discovery today* 21(2): 363–68. doi:10.1016/j.drudis.2015.11.016.
- Kakkar, Shilpa, Sankunni Mohan Karuppayil, Jayant S Raut, Fabrizio Giansanti, Laura Papucci, Nicola Schiavone, and Indu Pal Kaur. 2015. "Lipid-Polyethylene Glycol Based Nano-Ocular Formulation of Ketoconazole." *International Journal of Pharmaceutics* 495(1): 276–89. doi:https://doi.org/10.1016/j.ijpharm.2015.08.088.
- Kang, Huizhi, Zhuo Zuo, Ru Lin, Muzi Yao, Yang Han, and Jing Han. 2022. "The Most Promising Microneedle Device: Present and Future of Hyaluronic Acid Microneedle Patch." *Drug delivery* 29(1): 3087–3110. doi:10.1080/10717544.2022.2125600.
- Kawase, Kazuhide, Wenzhong Lin, Yumiko Aoyama, Tetsuya Yamamoto, Masamitsu Shimazawa, and Hideaki Hara. 2010. "Effects of Timolol-Related Ophthalmic Solutions on Cultured Human Conjunctival Cells." *Japanese journal of ophthalmology* 54(6): 615–21. doi:10.1007/s10384-010-0881-2.
- Kemenkes RI. 2018. 2018 *Peta Jalan Penanggulangan Gangguan Penglihatan Di Indonesia Tahun 2017-2030*. <http://www.p2ptm.kemkes.go.id/dokumen-ptm/buku-peta-jalan-penanggulangan-gangguan-penglihatan-di-indonesia-tahun-2017-2030>.
- Khan, Javed, Aatif Khan, Aman Khan, Danish Khan, Abdul Shaikh, and Mirza Salman Baig. 2024. "In Situ Gel: A Promising Ocular Drug Delivery System." *International Journal of Advancement in Life Sciences Research* 07: 65–77. doi:10.31632/ijalsr.2024.v07i03.006.
- Khatoon, Hena, Siti M M Faudzi, and Tamás Sohajda. 2025. "Mechanisms and Therapeutic Applications of B-Cyclodextrin in Drug Solubilisation and Delivery Systems." *Chemistry & Biodiversity*. doi:10.1002/cbdv.202500359.
- Khattab, Abeer, Sarah Marzok, and Magdy Ibrahim. 2019. "Development of Optimized Mucoadhesive Thermosensitive Pluronic Based in Situ Gel for Controlled Delivery of Latanoprost: Antiglaucoma Efficacy and Stability Approaches." *Journal of Drug Delivery Science and Technology* 53: 101134. doi:https://doi.org/10.1016/j.jddst.2019.101134.
- Khiev, Dawin, Zeinab A Mohamed, Riddhi Vichare, Ryan Paulson, Sofia Bhatia, Subhra Mohapatra, Glenn P Lobo, et al. 2021. "Emerging Nano-Formulations and Nanomedicines Applications for Ocular Drug Delivery." *Nanomaterials (Basel, Switzerland)* 11(1). doi:10.3390/nano11010173.
- Kim, Dong-Hyun, Sang-Eun Lee, Yong-Chul Pyo, Tran Phuong, and Jeong-Sook Park. 2019. "Solubility Enhancement and Application of Cyclodextrins in Local Drug Delivery." *Journal of Pharmaceutical Investigation* 50: 1–11. doi:10.1007/s40005-019-00434-2.
- Kim, Yoo C, Hans E Grossniklaus, Henry F Edelhauser, and Mark R Prausnitz. 2014. "Intrastromal Delivery of Bevacizumab Using Microneedles to Treat Corneal Neovascularization." *Investigative ophthalmology & visual science* 55(11): 7376–

86. doi:10.1167/iov.14-15257.

- Kurniawansyah, Insan Sunan, Taofik Rusdiana, Iyan Sopyan, Handrian Ramoko, Habibah A. Wahab, and Anas Subarnas. 2020. "In Situ Ophthalmic Gel Forming Systems of Poloxamer 407 and Hydroxypropyl Methyl Cellulose Mixtures for Sustained Ocular Delivery of Chloramphenicol: Optimization Study by Factorial Design." *Heliyon* 6(11). doi:10.1016/j.heliyon.2020.e05365.
- Lachowicz, Malwina, Andrzej Stańczak, and Michał Kołodziejczyk. 2020. "Characteristic of Cyclodextrins: Their Role and Use in the Pharmaceutical Technology." *Current drug targets* 21(14): 1495–1510. doi:10.2174/1389450121666200615150039.
- Lakhani, Prit, Akash Patil, and Soumyajit Majumdar. 2019. "Challenges in the Polyene- and Azole-Based Pharmacotherapy of Ocular Fungal Infections." *Journal of ocular pharmacology and therapeutics : the official journal of the Association for Ocular Pharmacology and Therapeutics* 35(1): 6–22. doi:10.1089/jop.2018.0089.
- Larrañeta, Eneko, Jessica Moore, Eva M Vicente-Pérez, Patricia González-Vázquez, Rebecca Lutton, A David Woolfson, and Ryan F Donnelly. 2014. "A Proposed Model Membrane and Test Method for Microneedle Insertion Studies." *International journal of pharmaceutics* 472(1–2): 65–73. doi:10.1016/j.ijpharm.2014.05.042.
- Lee, Jae-ung, Sung-Sik Lee, Sungyul Lee, and Han B Oh. 2020. "Noncovalent Complexes of Cyclodextrin with Small Organic Molecules: Applications and Insights into Host–Guest Interactions in the Gas Phase and Condensed Phase." *Molecules* 25(18): 4048. doi:10.3390/molecules25184048.
- Li, Liping, Fan Jia, Youxiang Wang, Jiamin Liu, Yi Tian, Xinghuai Sun, Yuan Lei, and Jian Ji. 2023. "Trans-Corneal Drug Delivery Strategies in the Treatment of Ocular Diseases." *Advanced Drug Delivery Reviews* 198: 114868. doi:https://doi.org/10.1016/j.addr.2023.114868.
- Liu, Shuai, Shuohan Xu, Hang Lu, Xueyu Gong, Huaipeng Li, Xinyu Fan, and Hongwei Yang. 2025. "Exploring the Potential of a Thermosensitive in Situ Gel with Periplaneta Americana Extracts for Efficient Wound Healing." *Frontiers in Pharmacology* Volume 16. doi:10.3389/fphar.2025.1672818.
- Loftsson, T., & Duchêne, D. 2020. "Cyclodextrins and Their Pharmaceutical Applications." *International Journal of Pharmaceutics*.
- Loftsson, T, and M Masson. 2001. "Cyclodextrins in Topical Drug Formulations: Theory and Practice." *International journal of pharmaceutics* 225(1–2): 15–30. doi:10.1016/s0378-5173(01)00761-x.
- Loftsson, Thorsteinn, and Marcus E Brewster. 2011. "Pharmaceutical Applications of Cyclodextrins: Effects on Drug Permeation through Biological Membranes." *Journal of Pharmacy and Pharmacology* 63(9): 1119–35. doi:10.1111/j.2042-7158.2011.01279.x.
- Loftsson, Thorsteinn, Pekka Jarho, Már Másson, and Tomi Järvinen. 2005. "Cyclodextrins in Drug Delivery." *Expert Opinion on Drug Delivery* 2(2): 335–51. doi:10.1517/17425247.2.1.335.
- Lu, Geng, Baohua Li, Luping Lin, Xiaofang Li, and Junfeng Ban. 2024. "Mechanical Strength Affecting the Penetration in Microneedles and PLGA Nanoparticle-

- Assisted Drug Delivery: Importance of Preparation and Formulation." *Biomedicine & pharmacotherapy* = *Biomedecine & pharmacotherapie* 173: 116339. doi:10.1016/j.biopha.2024.116339.
- Mahmoudi, Shahram, Ahmad Masoomi, Kazem Ahmadikia, Seyed Ali Tabatabaei, Mohammad Soleimani, Sassan Rezaie, Hossein Ghahvechian, and Ali Banafsheafshan. 2018. "Fungal Keratitis: An Overview of Clinical and Laboratory Aspects." *Mycoses* 61(12): 916–30. doi:10.1111/myc.12822.
- Majeed, Bashar J M, Mohammed A Saadallah, Israa H Al-Ani, Mohamed K El-Tanani, Khaldun M Al Azzam, Hassan H Abdallah, and Feras Al-Hajji. 2024. "Evaluation of Solubility, Dissolution Rate, and Oral Bioavailability of β -Cyclodextrin and Hydroxypropyl β -Cyclodextrin as Inclusion Complexes of the Tyrosine Kinase Inhibitor, Alectinib." *Pharmaceuticals* 17(6): 737. doi:10.3390/ph17060737.
- Mangolim, Camila Sampaio, Cristiane Moriwaki, Ana Claudia Nogueira, Francielle Sato, Mauro Luciano Baesso, Antônio Medina Neto, and Graciette Mاتيoli. 2014. "Curcumin- β -Cyclodextrin Inclusion Complex: Stability, Solubility, Characterisation by FT-IR, FT-Raman, X-Ray Diffraction and Photoacoustic Spectroscopy, and Food Application." *Food Chemistry* 153: 361–70. doi:https://doi.org/10.1016/j.foodchem.2013.12.067.
- Moawad, Fatma, Roxane Pouliot, and Davide Brambilla. 2025. "Dissolving Microneedles in Transdermal Drug Delivery: A Critical Analysis of Limitations and Translation Challenges." *Journal of controlled release : official journal of the Controlled Release Society* 383: 113794. doi:10.1016/j.jconrel.2025.113794.
- Morsi, Nadia, Dalia Ghorab, Hanan Refai, and Hoda Teba. 2016. "Ketorolac Tromethamine Loaded Nanodispersion Incorporated into Thermosensitive in Situ Gel for Prolonged Ocular Delivery." *International Journal of Pharmaceutics* 506(1): 57–67. doi:https://doi.org/10.1016/j.ijpharm.2016.04.021.
- Mostafa, Mahmoud, Adel Al Fatease, Raid G Alany, and Hamdy Abdelkader. 2023. "Recent Advances of Ocular Drug Delivery Systems: Prominence of Ocular Implants for Chronic Eye Diseases." *Pharmaceutics* 15(6). doi:10.3390/pharmaceutics15061746.
- Muankaew, Chutimon, Phatsawee Jansook, and Thorsteinn Loftsson. 2017. "Evaluation of γ -Cyclodextrin Effect on Permeation of Lipophilic Drugs: Application of Cellophane/Fused Octanol Membrane." *Pharmaceutical development and technology* 22(4): 562–70. doi:10.1080/10837450.2016.1180394.
- Müller, Guilherme Gubert, Newton Kara-José, and Rosane Silvestre de Castro. 2013. "Antifúngicos Em Infecções Oculares: Drogas e Vias de Administração." *Revista Brasileira de Oftalmologia* 72.
- Musuc, Adina M. 2024. "Cyclodextrins: Advances in Chemistry, Toxicology, and Multifaceted Applications." *Molecules* 29(22): 5319. doi:10.3390/molecules29225319.
- Niu, Lingzhi, Xin Liu, Zhiming Ma, Yuan Yin, Lixia Sun, Longfei Yang, and Yajuan Zheng. 2020. "Fungal Keratitis: Pathogenesis, Diagnosis and Prevention." *Microbial pathogenesis* 138: 103802. doi:10.1016/j.micpath.2019.103802.
- Omidian, Hossein, Arnavaz Akhzarmehr, and Erma J Gill. 2025. "Cyclodextrin–Hydrogel

- Hybrids in Advanced Drug Delivery.” *Gels* 11(3): 177. doi:10.3390/gels11030177.
- Onugwu, Adaeze Linda, Chinekwu Sherridan Nwagwu, Obinna Sabastine Onugwu, Adaeze Chidiebere Echezona, Chinazom Precious Agbo, Stella Amarachi Ihim, Prosper Emeh, et al. 2023. “Nanotechnology Based Drug Delivery Systems for the Treatment of Anterior Segment Eye Diseases.” *Journal of Controlled Release* 354: 465–88. doi:https://doi.org/10.1016/j.jconrel.2023.01.018.
- Pantsar, Tatu, and Antti Poso. 2018. “Binding Affinity via Docking: Fact and Fiction.” *Molecules* 23(8): 1899. doi:10.3390/molecules23081899.
- Patel, Ashaben. 2013. “Ocular Drug Delivery Systems: An Overview.” *World Journal of Pharmacology* 2(2): 47. doi:10.5497/wjp.v2.i2.47.
- Patel, Ashaben, Kishore Cholkar, Vibhuti Agrahari, and Ashim Mitra. 2015. “Ocular Drug Delivery Systems: An Overview.” *World journal of pharmacology* 2: 47–64. doi:10.5497/wjp.v2.i2.47.
- Patel, Ashaben, Kishore Cholkar, Vibhuti Agrahari, and Ashim K Mitra. 2013. “Ocular Drug Delivery Systems: An Overview.” *World journal of pharmacology* 2(2): 47–64. doi:10.5497/wjp.v2.i2.47.
- Permana, Andi Dian, Rifka Nurul Utami, Patricia Layadi, Achmad Himawan, Nana Juniarti, Qonita Kurnia Anjani, Emilia Utomo, et al. 2021. “Thermosensitive and Mucoadhesive in Situ Ocular Gel for Effective Local Delivery and Antifungal Activity of Itraconazole Nanocrystal in the Treatment of Fungal Keratitis.” *International Journal of Pharmaceutics* 602: 120623. doi:https://doi.org/10.1016/j.ijpharm.2021.120623.
- Pickel, Julia, Shivananda Narayana, Tiruvengada Krishnan, Seema Ramakrishnan, Puja Prativa Samantaray, Travis C Porco, Travis Redd, Thomas M Lietman, and Jennifer Rose-Nussbaumer. 2020. “The Prognostic Value of Persistent Culture Positivity in Fungal Keratitis in the Mycotic Antimicrobial Localized Injection Trial.” *American Journal of Ophthalmology* 215: 1–7. doi:https://doi.org/10.1016/j.ajo.2020.02.021.
- Popescu, Irina, Marieta Constantin, Maria Bercea, Bogdan-Paul Coşman, Dana M Suflet, and Gheorghe Fundueanu. 2023. “Poloxamer/Carboxymethyl Pullulan Aqueous Systems—Miscibility and Thermogelation Studies Using Viscometry, Rheology and Dynamic Light Scattering.” *Polymers* 15(8): 1909. doi:10.3390/polym15081909.
- Putri, Rasma Adelia, Cindy Kristina Enggi, Sulistiawati Sulistiawati, Habiburrahim Burhanuddin, Israini Wiyulanda Iskandar, Rizki Rachmad Saputra, Latifah Rahman, et al. 2024. “Development of Itraconazole Ocular Delivery System Using β -Cyclodextrin Complexation Incorporated into Dissolving Microneedles for Potential Improvement Treatment of Fungal Keratitis.” *Journal of biomaterials science. Polymer edition*: 1–28. doi:10.1080/09205063.2024.2380129.
- Qutub, Mohammad, Amol Tatode, Tanvi Premchandani, Jayshree Taksande, Dadaso Mane, and Milind Umekar. 2024. “Blending Induced Variations in Poloxamer’s/Pluronic’s® Gelation: Thermodynamic and Rheological Perspectives.” *JCIS Open* 16: 100126. doi:https://doi.org/10.1016/j.jciso.2024.100126.
- Ranta, Veli-Pekka, and Arto Urtti. 2006. “Transscleral Drug Delivery to the Posterior Eye: Prospects of Pharmacokinetic Modeling.” *Advanced Drug Delivery Reviews* 58(11): 1164–81. doi:https://doi.org/10.1016/j.addr.2006.07.025.

- Rojekar, Satish, Swapnali Parit, Amol D Gholap, Ajit Manchare, Sopan N Nangare, Navnath Hatvate, Vrashabh V Sugandhi, Keshav R Paudel, and Rahul G Ingle. 2024. "Revolutionizing Eye Care: Exploring the Potential of Microneedle Drug Delivery." *Pharmaceutics* 16(11): 1398. doi:10.3390/pharmaceutics16111398.
- Rupenthal, Ilva D, Colin R Green, and Raid G Alany. 2011. "Comparison of Ion-Activated in Situ Gelling Systems for Ocular Drug Delivery. Part 1: Physicochemical Characterisation and in Vitro Release." *International journal of pharmaceutics* 411(1–2): 69–77. doi:10.1016/j.ijpharm.2011.03.042.
- Rusdin, Agus, Amirah Mohd Gazzali, Nur Ain Thomas, Sandra Megantara, Diah Lia Aulifa, Arif Budiman, and Muchtaridi Muchtaridi. 2024. "Advancing Drug Delivery Paradigms: Polyvinyl Pyrrolidone (PVP)-Based Amorphous Solid Dispersion for Enhanced Physicochemical Properties and Therapeutic Efficacy." *Polymers* 16(2). doi:10.3390/polym16020286.
- Russo, Eleonora, and Carla Villa. 2019. "Ploxamer Hydrogels for Biomedical Applications." *Pharmaceutics* 11(12). doi:10.3390/pharmaceutics11120671.
- Sahay, Pranita, Deepali Singhal, Ritu Nagpal, Prafulla K Maharana, Marjan Farid, Rachel Gelman, Rajesh Sinha, et al. 2019. "Pharmacologic Therapy of Mycotic Keratitis." *Survey of Ophthalmology* 64(3): 380–400. doi:https://doi.org/10.1016/j.survophthal.2019.02.007.
- Said, Dalia G, Muneer Otri, Ammar Miri, Anusha Kailasanathan, Tasneem Khatib, and Harminder S Dua. 2011. "The Challenge of Fungal Keratitis." *British Journal of Ophthalmology* 95(12): 1623 LP – 1624. doi:10.1136/bjophthalmol-2011-301148.
- dos Santos, Cristina, M Pilar Buera, and M Florencia Mazzobre. 2012. "Influence of Ligand Structure and Water Interactions on the Physical Properties of β -Cyclodextrins Complexes." *Food Chemistry* 132(4): 2030–36. doi:https://doi.org/10.1016/j.foodchem.2011.12.044.
- Saokham, Phennapha, Chutimon Muankaew, Phatsawee Jansook, and Thorsteinn Loftsson. 2018. "Solubility of Cyclodextrins and Drug/Cyclodextrin Complexes." *Molecules* 23(5). doi:10.3390/molecules23051161.
- Sapiun, Zulfiayu, Arlan K Imran, Siti Nur Fatimah S. Mohamad, Andi Nur Aisyah, Stephani Stephani, Achmad Himawan, Marianti Manggau, et al. 2024. "Hispidulin-Rich Fraction of Clerodendrum Fragrans Wild. (Sesewanua) Dissolving Microneedle as Antithrombosis Candidate: A Proof of Concept Study." *International Journal of Pharmaceutics*: 124766. doi:https://doi.org/10.1016/j.ijpharm.2024.124766.
- Sathyanarayana, Sandeep Divate, Narayana Charyulu Rompicherla, and Anoop Narayanan. 2020. "Development of Thermosensitive Ophthalmic in Situ Gels of Bimatoprost for Glaucoma Therapy." 54(2). doi:10.5530/ijper.54.2s.71.
- Schott, Jennifer A, Chi-Linh Do-Thanh, Weida Shan, Nicolette G Puskar, Sheng Dai, and Shannon M Mahurin. 2021. "FTIR Investigation of the Interfacial Properties and Mechanisms of CO₂ Sorption in Porous Ionic Liquids." *Green Chemical Engineering* 2(4): 392–401. doi:https://doi.org/10.1016/j.gce.2021.09.003.
- Senjoti, F G, P Timmins, B R Conway, and A M Smith. 2020. "Optimizing Ophthalmic Delivery of a Poorly Water Soluble Drug from an Aqueous in Situ Gelling System." *European journal of pharmaceutics and biopharmaceutics: official journal of*

- Arbeitsgemeinschaft für Pharmazeutische Verfahrenstechnik e.V* 154: 1–7. doi:10.1016/j.ejpb.2020.06.016.
- Soliman, K., Ullah, K., Shah, A., Jones, D. S., & Singh, T. R. R. 2019. "Poloxamer-Based in Situ Gelling Thermoresponsive Systems for Ocular Drug Delivery Applications School of Pharmacy , Queen ' s University Belfast , Medical Biology Centre , 97 Lisburn Road , Belfast Department of Pharmacy , COMSATS University Islamabad , A." 24(8): 1575-1586.
- Soliman, Karim A, K Ullah, A Shah, David S Jones, and Thakur R R Singh. 2019. "Poloxamer-Based in Situ Gelling Thermoresponsive Systems for Ocular Drug Delivery Applications." *Drug Discovery Today* 24(8): 1575–86. doi:https://doi.org/10.1016/j.drudis.2019.05.036.
- Stegemann, S, F Leveiller, D Franchi, H de Jong, and H Lindén. 2007. "When Poor Solubility Becomes an Issue: From Early Stage to Proof of Concept." *European journal of pharmaceutical sciences : official journal of the European Federation for Pharmaceutical Sciences* 31(5): 249–61. doi:10.1016/j.ejps.2007.05.110.
- Sulistiawati, Sulistiawati, Cindy Kristina Enggi, Israini Wiyulanda Iskandar, Rizki Rachmad Saputra, Sartini Sartini, Yusnita Rifai, Latifah Rahman, Muhammad Aswad, and Andi Dian Permana. 2024. "Bioavailability Enhancement of Sildenafil Citrate via Hydrogel-Forming Microneedle Strategy in Combination with Cyclodextrin Complexation." *International Journal of Pharmaceutics* 655(March): 124053. doi:10.1016/j.ijpharm.2024.124053.
- Sun, Xiaowen, Junxiang Zhu, Chengqin Liu, Dongfeng Wang, and Chang Yun Wang. 2022. "Fabrication of Fucoxanthin/2-Hydroxypropyl- β -Cyclodextrin Inclusion Complex Assisted by Ultrasound Procedure to Enhance Aqueous Solubility, Stability and Antitumor Effect of Fucoxanthin." *Ultrasonics Sonochemistry* 90(October): 106215. doi:10.1016/j.ultsonch.2022.106215.
- Szente, Lajos, Ashutosh Singhal, Andras Domokos, and Byeongwoon Song. 2018. "Cyclodextrins: Assessing the Impact of Cavity Size, Occupancy, and Substitutions on Cytotoxicity and Cholesterol Homeostasis." *Molecules* 23(5): 1228. doi:10.3390/molecules23051228.
- Thakur, Raghu Raj Singh, Ismaiel A Tekko, Farhan Al-Shammari, Ahlam A Ali, Helen McCarthy, and Ryan F Donnelly. 2016. "Rapidly Dissolving Polymeric Microneedles for Minimally Invasive Intraocular Drug Delivery." *Drug Delivery and Translational Research* 6(6): 800–815. doi:10.1007/s13346-016-0332-9.
- Thakur Singh, Raghu Raj, Ismaiel Tekko, Kathryn McAvoy, Hannah McMillan, David Jones, and Ryan F Donnelly. 2017. "Minimally Invasive Microneedles for Ocular Drug Delivery." *Expert opinion on drug delivery* 14(4): 525–37. doi:10.1080/17425247.2016.1218460.
- Thomas, P A, and J Kaliyamurthy. 2013. "Mycotic Keratitis: Epidemiology, Diagnosis and Management." *Clinical microbiology and infection : the official publication of the European Society of Clinical Microbiology and Infectious Diseases* 19(3): 210–20. doi:10.1111/1469-0691.12126.
- Ting, Darren Shu Jeng, Charlotte Shan Ho, Rashmi Deshmukh, Dalia G Said, and Harminder S Dua. 2021. "Infectious Keratitis: An Update on Epidemiology, Causative Microorganisms, Risk Factors, and Antimicrobial Resistance." *Eye*

- (London, England) 35(4): 1084–1101. doi:10.1038/s41433-020-01339-3.
- Tirucherai, Giridhar S, and Ashim K Mitra. 2003. "Effect of Hydroxypropyl Beta Cyclodextrin Complexation on Aqueous Solubility, Stability, and Corneal Permeation of Acyl Ester Prodrugs of Ganciclovir." *AAPS PharmSciTech* 4(3): E45. doi:10.1208/pt040345.
- Torres, M A, J Mohamed, H Cavazos-Adame, and L A Martinez. 1985. "Topical Ketoconazole for Fungal Keratitis." *American journal of ophthalmology* 100(2): 293–98. doi:10.1016/0002-9394(85)90795-0.
- Trucillo, Paolo. 2022. "Drug Carriers: A Review on the Most Used Mathematical Models for Drug Release." *Processes* 10(6): 1094. doi:10.3390/pr10061094.
- Valente, Artur J M, and Olle Söderman. 2014. "The Formation of Host-Guest Complexes between Surfactants and Cyclodextrins." *Advances in colloid and interface science* 205: 156–76. doi:10.1016/j.cis.2013.08.001.
- Volpe-Zanutto, Fabiana, Lalitkumar K Vora, Ismaiel A Tekko, Peter E McKenna, Andi Dian Permana, Akmal H Sabri, Qonita K Anjani, et al. 2022. "Hydrogel-Forming Microarray Patches with Cyclodextrin Drug Reservoirs for Long-Acting Delivery of Poorly Soluble Cabotegravir Sodium for HIV Pre-Exposure Prophylaxis." *Journal of controlled release : official journal of the Controlled Release Society* 348: 771–85. doi:10.1016/j.jconrel.2022.06.028.
- Vora, Lalit K, Pradeep R Vavia, Eneko Larrañeta, Steven E J Bell, and Ryan F Donnelly. 2018. "Novel Nanosuspension-Based Dissolving Microneedle Arrays for Transdermal Delivery of a Hydrophobic Drug." *Journal of interdisciplinary nanomedicine* 3(2): 89–101. doi:10.1002/jin2.41.
- Walfish, S. 2006. "Analytical Methods: A Statistical Perspective on the ICH Q2A and Q2B Guidelines for Validation of Analytical Methods TYPES OF ANALYTICAL METHODS." <http://www.biopharminternational.com/biopharm/content/printContentPopup.jsp?id=392483>.
- Wang, Qiuxiang, Aiwen Zhang, Lu Zhu, Xuewen Yang, Guihua Fang, and Bo Tang. 2023. "Cyclodextrin-Based Ocular Drug Delivery Systems: A Comprehensive Review." *Coordination Chemistry Reviews* 476: 214919. doi:10.1016/j.ccr.2022.214919.
- Wu, Yu, Lalitkumar K Vora, Ryan F Donnelly, and Thakur Raghu Raj Singh. 2023. "Rapidly Dissolving Bilayer Microneedles Enabling Minimally Invasive and Efficient Protein Delivery to the Posterior Segment of the Eye." *Drug delivery and translational research* 13(8): 2142–58. doi:10.1007/s13346-022-01190-x.
- Wu, Yumei, Yuanyuan Liu, Xinyue Li, Dereje Kebebe, Bing Zhang, Jing Ren, Jun Lu, et al. 2019. "Research Progress of In-Situ Gelling Ophthalmic Drug Delivery System." *Asian journal of pharmaceutical sciences* 14(1): 1–15. doi:10.1016/j.ajps.2018.04.008.
- Xia, Huiyun, Jingjing Yang, Fei Song, Guojuan Pu, Fudan Dong, Zhen Liang, and Junjie Zhang. 2024. "Development of Ion-Triggered in Situ Gel Containing Ketoconazole/Hydroxypropyl- β -Cyclodextrin for Ocular Delivery: In Vitro and in Vivo Evaluation." *Drug delivery* 31(1): 2424217. doi:10.1080/10717544.2024.2424217.

- Xu, Peng-Wei, Xiao-Fan Yuan, Hang Li, Yuan Zhu, and Bing Zhao. 2023. "Preparation, Characterization, and Physicochemical Property of the Inclusion Complexes of Cannabisin A with β -Cyclodextrin and Hydroxypropyl- β -Cyclodextrin." *Journal of Molecular Structure* 1272: 134168. doi:https://doi.org/10.1016/j.molstruc.2022.134168.
- Yadav, Khushwant S, Rahul Rajpurohit, and Sushmita Sharma. 2019. "Glaucoma: Current Treatment and Impact of Advanced Drug Delivery Systems." *Life Sciences* 221: 362–76. doi:https://doi.org/10.1016/j.lfs.2019.02.029.
- Yang, Yingjia, and Alastair Lockwood. 2022. "Topical Ocular Drug Delivery Systems: Innovations for an Unmet Need." *Experimental Eye Research* 218: 109006. doi:https://doi.org/10.1016/j.exer.2022.109006.
- Yao, Yashu, Yan Xie, Chao Hong, Guowen Li, Hongyi Shen, and Guang Ji. 2014. "Development of a Myricetin/Hydroxypropyl- β -Cyclodextrin Inclusion Complex: Preparation, Characterization, and Evaluation." *Carbohydrate Polymers* 110: 329–37. doi:https://doi.org/10.1016/j.carbpol.2014.04.006.
- Youssef, Ahmed, Narendar Dudhipala, and Soumyajit Majumdar. 2020. "Ciprofloxacin Loaded Nanostructured Lipid Carriers Incorporated into In-Situ Gels to Improve Management of Bacterial Endophthalmitis." *Pharmaceutics* 12(6). doi:10.3390/pharmaceutics12060572.
- Zarei Chamgordani, Nasrin, Sasan Asiaei, Fatemeh Ghorbani-Bidkorpeh, Masoud Babaei Foroutan, Mostafa Dahmardehei, and Hamid Reza Moghimi. 2024. "A Long-Lasting Triamcinolone-Loaded Microneedle Patch for Prolonged Dermal Delivery." *Iranian journal of pharmaceutical research: IJPR* 23(1): e138857. doi:10.5812/ijpr-138857.
- Zhang, Junjie, Liya Wang, Changfeng Gao, Li Zhang, and Huiyun Xia. 2008. "Ocular Pharmacokinetics of Topically-Applied Ketoconazole Solution Containing Hydroxypropyl Beta-Cyclodextrin to Rabbits." *Journal of ocular pharmacology and therapeutics: the official journal of the Association for Ocular Pharmacology and Therapeutics* 24(5): 501–6. doi:10.1089/jop.2008.0015.
- Zhao, Lin, Jiamei Chen, Bai Bai, Guili Song, Jingwen Zhang, Han Yu, Shiwei Huang, Zhang Wang, and Guanghua Lu. 2023. "Topical Drug Delivery Strategies for Enhancing Drug Effectiveness by Skin Barriers, Drug Delivery Systems and Individualized Dosing." *Frontiers in pharmacology* 14: 1333986. doi:10.3389/fphar.2023.1333986.
- Zheng, Pinxuan, Xueying Liu, Yanqing Jiao, Xuran Mao, Zhaorong Zong, Qi Jia, Heng Bo Jiang, Eui-Seok Lee, and Qi Chen. 2024. "Preparation and Evaluation of Poloxamer/Carbopol In-Situ Gel Loaded with Quercetin: In-Vitro Drug Release and Cell Viability Study." *Tissue engineering and regenerative medicine* 21(8): 1153–71. doi:10.1007/s13770-024-00671-z.