

## **Philip J. Breen, Ph.D.**

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### Recipient:

Kappa Psi Teacher of the Year Award, 1989  
Inventor of the Year Award, UAMS Biotechnology Center, November 1995  
U.A.M.S. Teaching Scholar Certificate, Sep. 10, 2009

### Teaching Responsibilities:

Basic Pharmacokinetics \*  
Advanced Biopharmaceutics and Pharmacokinetics \*  
Pharmacokinetic Research Design and Data Analysis \*  
Pharmaceutics I: lecturer  
\* Course Co-ordinator

### Scientific Presentations

1. Panichpol, S, **Breen, PJ**, et al, "Effect of Dimethyl Sulfoxide on Phenylbutazone Pharmacokinetics in Rabbits." American Pharmacy Association, Academy of Pharmaceutical Sciences, Nov., 1983.
2. Shargel, L, **Breen, PJ**, et al, "Analysis of Phenylbutazone and Oxyphenbutazone in Human Serum: Single Dose Pharmacokinetic Study." American Pharmacy Association, Academy of Pharmaceutical Sciences, Nov., 1983.
3. **Breen, PJ**, Jambhekar, SS, et al, "Relationship of Drug Protein Binding Constants Derived from Scatchard Equation to the Fraction Drug Bound." American Society for Pharmacology and Experimental Therapeutics, Aug. 1985; abstracted in *Pharmacologist* 27: 271, 1985.
4. **Breen, PJ** and Shargel, L, "Effect of Azathioprine and 6-Mercaptopurine on Hepatic Mixed Function Oxidase Activity in the Rat." American Society for Pharmacology and Experimental Therapeutics, May 1986; abstracted in *Pharmacologist* 28: 116, 1986.
5. Berg, T., **Breen, PJ**, et al, "Acute Toxicity of Gancyclovir: Effect of Dietary Restriction and Chronobiology," Fifth International Conference on Chronopharmacology, July 1992.
6. Berg, T, **Breen, PJ**, et al, "Acute Toxicity of Gancyclovir," presented at U.S. Food and Drug Administration workshop: "The Effects of Dietary Restriction and their Implications for the Design and Interpretation of Toxicity and Carcinogenicity Studies," Feb. 23, 1993.
7. Lattin, D, **Breen, PJ**, et al, "Novel Chemical Probes to Study the Attachment of Salmonella to Poultry Tissue," invited presentation, American Association of Food Hygiene Veterinarians, Oct. 28, 1993.
8. **Breen, PJ**, Compadre, CM, et al, "Protection against Salmonella typhimurium contamination of chicken tissue by use of cetylpyridinium chloride," USDA FSIS Conference on New Technology to Improve Food Safety, Chicago, IL, April 1995.

9. **Breen, PJ**, Compadre CM, et al, "Quaternary ammonium compounds: basic and applied studies to prevent bacterial attachment," presented at Food Safety Consortium Annual Meeting, Kansas City, MO, October 1996.
10. Zhou, X., **Breen, P.**, Gann, L., Compadre, C., Hiller, F.C., and Anderson, PJ. "Pulmonary Absorption of Inhaled Albuterol." Pulmonary Society Conference, Kobe, Japan, 1997.
11. Anderson, PJ, Zhou, X., **Breen, P.**, Gann, L., Compadre, C., and Hiller, F.C. "Gender Differences in Albuterol Pharmacokinetics." American Thoracic Society, 1997.
12. Anderson, PJ, Zhou, X., **Breen, P.**, Gann, L., Compadre, C., and Hiller, F.C. "Pharmacokinetics of Inhaled Albuterol in Asthmatic Subjects." ALA/ATS Conference, San Francisco, 1998.
13. Hiller, F.C., Razmi, S., Zhou, X., **Breen, P.**, Gann, L., Compadre, C., and Anderson, PJ. "Pharmacokinetics of Albuterol Inhaled from Metered Dose Inhaler and Nebulizer by Asthmatic Subjects." 12<sup>th</sup> International Congress, International Society for Aerosols in Medicine, Vienna, Austria, June, 1999.
14. Anderson, P., Zhou, X., **Breen, P.J.**, Gann, L., Compadre, C., and Hiller, F.C. "Pharmacodynamics of Inhaled Albuterol in Asthmatic Subjects Is Not Affected by Hydrofluoroalkane-134A (HFA) Propellant," ALA/ATS International Conference, April, 2000.
15. Pasley, J., Compadre, C., Ross, M., and **Breen, P.J.**, "The Virtual Esophagus: Phase II," American Chemical Society, May, 2000.
16. Compadre, C., Sumpter, J., Ross, M., **Breen, P.J.**, and Pasley, J., "The Virtual Esophagus: Progress in the Development of an Anatomically Accurate Model of Esophageal Motility," 27<sup>th</sup> annual MALTO meeting, New Orleans, LA, May, 2000.
17. Sumpter, J.A., **Breen, P.J.**, Pasley, J.N., Cheng, R., Ross, M.D., and Compadre, C.M., "The Development of Simulations of Human Physiology in Weightless Environments," Virtual Worlds and Simulations 2001 Conference, Phoenix, AZ, Jan 7-11, 2001.
18. Sumpter, J., Breen, P., Pasley, J., Compadre, C., Ross, M, and Cheng, R, "Simulation of Human Physiology in Weightless Environments", Arkansas Space Grant Consortium Annual Meeting, Searcy, AR, April 27, 2001.
19. Joguparthi, V., Breen, P., and Compadre, C. "Residual Drug in Pharmacokinetics", Annual MALTO Conference, Oxford, MS., May 19, 2001
20. Anderson, Zhou, Breen, Gann, Compadre, and Hiller, "Relationship of Plasma Albuterol Level to FEV<sub>1</sub> in Asthmatic Subjects," American Thoracic Society International Conference, San Francisco, May 18-23, 2001.
21. Joguparthi, V., **Breen, P.J.**, Anderson, P., Zhou, X., Compadre, C., and Hiller, F.C., "Effect of Propellant on the Pharmacokinetics and Pharmacodynamics of Albuterol in Human Asthmatics," International Society for Aerosols in Medicine, 13<sup>th</sup> International Congress, Interlaken, Switzerland, Sep. 17-21, 2001. **(Received Eli Lilly Award)**.
22. Anderson, P., **Breen, P.J.**, Joguparthi, V., Compadre, C., and Hiller, F.C., "Pharmacodynamics of Inhaled Albuterol via different devices and propellants in asthmatic subjects" International Society for Aerosols in Medicine, 13<sup>th</sup> International Congress, Interlaken, Switzerland, Sep. 17-21, 2001
23. Arkansas Space Grant Consortium Annual Meeting, Jonesboro, AR, April 26, 2002. **Breen, P.**, Sumpter, J., Pasley, J., Compadre, C. "Computer Simulations of the Expected

- Changes in Esophageal Transport, Gastrointestinal Absorption, and Pharmacodynamics of orally Ingested Agents in Weightlessness”.
24. PharmForum, Southern Regional Discussion Group, AAPS, Little Rock, AR, May 31, 2002, Joguparthi, Anderson, Hiller, Gann, Compadre, and **Breen**, “Effect of Propellant on the Pharmacokinetics and Pharmacodynamics of Albuterol in Human Asthmatics.”
  25. American Thoracic Society Meeting, Atlanta, May, 2002. Anderson PJ, **Breen P**, Joguparthi V, Gann LP, Compadre C, Hiller FC. "Pharmacokinetics of inhaled albuterol in adults with cystic fibrosis."
  26. Arkansas Space Grant Consortium Annual Meeting, Conway, AR, April 25, 2003. **Breen, P.**, Wallace, T., Pasley, J., Compadre, C. “The Use of Physiological Models to Simulate the Pharmacokinetics and Pharmacodynamics of Drugs in Weightlessness”.
  27. Annual MALTO Conference, Little Rock, AR, May 19, 2003, Caldwell, D., **Breen, P.**, and Compadre, C. “Development of a GC/MS Assay for Salmeterol.”
  28. American Thoracic Society International Conference, Seattle, WA, May 21, 2003, Anderson, P.; Breen, P.; Joguparthi, V.; Gann, L.; Compadre, C.; and Hiller, F.C. “Pharmacokinetics and Pharmacodynamics of Inhaled Albuterol in Adults with Cystic Fibrosis Compared with Normal Subjects.”
  29. American Pharmaceutical Association Conference, Washington, D.C., Nov. 9, 2004, Ochoa ER, Robles E, Breen PJ, Bieber E, Eigenbrodt M, and Compadre CM. “A Community-state Agency-university Partnership for Assessment, Demonstration and Improvement of the Environment in a New Latino Growth Area.”
  30. American Chemical Society Conference, Washington, D.C., August 28, 2005, Maria Jose Munoz-Fambuena, **Phil Breen**, David Caldwell, Thomas Godwin, Zhou Xiang, Paula Anderson, Charles Hiller, and Cesar M Compadre. “Determination of Salmeterol in plasma by gas chromatography-mass spectrometry with selected-ion monitoring”
  31. NASA Jet Propulsion Laboratories, Pasadena, CA, Oct. 15, 2007, Compadre CM, Sumpter JA, and **Breen, PJ**. “The Development of Simulations of Human Physiology in Weightless Environments.”
  32. Conference on Normal Tissue Radiation Effects and Countermeasures, Winthrop Rockefeller Institute Conference Center, Morrilton, AR, April 26, 2010, Compadre CM and **Breen PJ**, “Development of Tocotrienols with Improved Distribution Characteristics.”
  33. AACP conference, July 2010, Cindy D Stowe, Eric F Schneider, Jeremy L Thomas, **Philip J Breen**, Denise Ragland, Seth D Heldenbrand, Jan K Hastings, Stephanie F Gardner. “Development & Implementation of a High-Stakes Senior Summative OSCE”
  34. Invited Presentation, Electronic and Information Technology Center, UALR, Little Rock, August, 2011. **Breen, PJ**. “Computer Simulation of the Pharmacokinetics and Pharmacodynamics of Drugs in Microgravity.”
  35. Sixth Annual Conference of the BioNanoTox, Little Rock, AR, November 17-18, 2011. Singh A, Hall R, **Breen PJ**, Kumar KS, Hauer-Jensen M, and Cesar M. Compadre CM. RPADaBase: The Database of Radiation Protection Agents.

36. APhA Southern Research Discussion Group, Little Rock, AR, Sep 27, 2013. **Breen, Philip J.** "The Art and Science of Fitting Your Data using Phoenix WinNonlin."
37. Thakkar S, Singh A, **Breen PJ**, Varughese KI, Hauer-Jensen M, Compadre CM, "A combined approach using docking and molecular dynamics to predict binding of vitamin E analogues to their transport protein." Mid-South Computational Biology and Bioinformatics Society Annual Meeting, Stillwater, OK, March 2014.
38. **Invited Presentation.** American Association of Pharmaceutical Scientists annual meeting, San Diego, CA, Nov. 4, 2014. **Breen, Philip J.** "The Role of Pharmacokinetics in Drug Discovery and Development."

### **Publications and Book Chapters**

1. Newton, DW, **Breen, PJ**, et al. "Physicochemical Characteristics of Patent Blue Violet Dye." *J. Pharm. Sci.* 70: 122-127, 1981.
2. Jambhekar, SS, **Breen, PJ**, et al. "Influence of Formulation and Other Factors on the Release of Chlorpheniramine Maleate from Polymer Coated Beads." *Drug Development and Ind. Pharmacy*, 13 (15): 2789-2810, 1987.
3. Jambhekar, SS and **Breen, PJ**. "Some Factors Influencing the Release of Drug from Nondisintegrating Slow Release Tablets." *Pharmaceutical Technology*, 14 (11): 1605-1615, 1988.
4. Berg, TF and **Breen, PJ**. "Acute Toxicity of Gancyclovir: Effect of Dietary Restriction and Chronobiology." *Food and Chemical Toxicology*, 32 (1): 45-50, 1994.
5. **Breen, PJ**, Compadre, CM, et al. "Quaternary Ammonium Compounds Inhibit and Reduce the Attachment of Viable *Salmonella typhimurium* to Poultry Tissues." *J. Food Sci.* 60: 1191-1196, 1995.
6. Logsdon, TW, Zhou, X., **Breen, PJ**, Anderson, PJ, Gann, L., Hiller, F.C., and Compadre, C. "Determination of Albuterol in Plasma after Aerosol Inhalation by GC/MS with Selected-ion Monitoring." *J. Chromatography B*, 692: 472-477, 1997.
7. **Breen, PJ**, Compadre, CM and Salari, H. "Elimination of *Salmonella* Contamination from Poultry Tissues by Cetylpyridinium Solutions." *J. Food Protection*, 60 (9): 1019-1021, 1997
8. Nyamweya, N, Gurley, BJ, **Breen, PJ**, and Light, KE. "Pharmacokinetics of Cocaine and Metabolites Following Intragastric Administration to Ten-Day-Old Rat Pups." *Pharmaceutical Research*, Vol. 15 (No. 3): 488-491, 1998.
9. Anderson, P, Zhou, X, **Breen, PJ**, Gann, L., Logsdon, TW, Compadre, C., and Hiller, F.C., "Pharmacokinetics of (R,S)-Albuterol after Aerosol Inhalation in Healthy Adult Volunteers." *J. Pharm. Sci.*, 87 (7): 841-844, 1998.
10. Zhou, X, Handie, A., Salari, H, Fifer, E., **Breen, P.** and Compadre, C. "High Performance Liquid Chromatography Determination of Residue Levels on Chicken Carcasses Treated with Cetylpyridinium Chloride." *J. Chromatography B*, 728: 273-277, 1999.
11. Goodwin, T., Zhou, X., Haile, P., **Breen, P.**, Anderson, P., Hiller, F.C., and Compadre, C. "Synthesis of <sup>13</sup>C, <sup>2</sup>H<sub>3</sub>-Salmeterol: An Analytical Internal Standard for Pharmacokinetic Studies." *J. Labelled Cpd. Radiopharm.* 43: 65-75, 2000.

12. Cutter, C. N., Dorsa, W. J., Handie, A., Rodriguez-Morales, S., Zhou, X., **Breen, P.**, and Compadre, C.M. "Antimicrobial activity of cetylpyridinium chloride washes against pathogenic bacteria on beef surfaces." *J. Food Prot.* 63(5): 593-600, 2000.
13. Sumpter, J.A., **Breen, P.J.**, Pasley, J.N., Cheng, R., Ross, M.D., and Compadre, C.M., "The Development of Simulations of Human Physiology in Weightless Environments" IN: *Virtual Worlds and Simulations 01*, Christopher Landauer and Kirstie L. Bellman, Eds., Society for Computer Simulation International, 2001.
14. Joguparthi, V., **Breen, P.J.**, Compadre, C.C., Zhou, X., Gann, L., Hiller, F.C., and Anderson, P. "Effect of Propellant on the Pharmacokinetics and Pharmacodynamics of Inhaled Albuterol in Asthmatic Subjects." *J. Aerosol Med.* 16(1): 47-53, 2003.
15. Rodríguez-Morales S., Zhou X., Salari H., Castillo R., **Breen PJ**, and Compadre C. "Liquid Chromatography Determination of Residue Levels on Apples Treated with Cetylpyridinium Chloride." *Journal of Chromatography A* 1062(2): 285-289, 14 Jan 2005.
16. Rodriguez-Morales, S, Compadre, RL, Castillo, R, **Breen, PJ**, and Compadre, CM. 3D-QSAR, Synthesis, and Antimicrobial Activity of 1-Alkylpyridinium Compounds as Potential Agents to Improve Food Safety. *European Journal of Food Chemistry* 2005; 40: 840-849.
17. Bill Gurley, Gary W Barone, D. Keith Williams, Julie Carrier, **Philip Breen**, C. Ryan Yates, Peng-fei Song, Martha A Hubbard, Yudong Tong, and Sreekhara Cheboyina . Effect of milk thistle (*Silybum marianum*) and black cohosh (*Cimicifuga racemosa*) supplementation on digoxin pharmacokinetics in humans. *Drug Metabolism and Disposition* 2006; 34: 69-74.
18. Bill Gurley, Martha A. Hubbard, D. Keith Williams, John Thaden, Yudong Tong, W. Brooks Gentry, **Philip Breen**, Danielle J. Carrier, and Shreekhara Cheboyina. Assessing the Clinical Significance of Botanical Supplementation on Human Cytochrome P450 3A Activity: Comparison of a Milk Thistle and Black Cohosh Product to Rifampin and Clarithromycin. *J Clin Pharmacol* 2006; 46: 201-213.
19. Gurley BJ, Ashley Swain, Gary W. Barone, D. Keith Williams, **Philip Breen**, C. Ryan Yates, Leslie B. Stuart, Martha A. Hubbard, Yudong Tong, and Sreekhara Cheboyina. "Effect of Goldenseal (*Hydrastis canadensis*) and Kava Kava (*Piper methysticum*) Supplementation on Digoxin Pharmacokinetics in Humans" *Drug Metabolism & Disposition* 2007; 35: 240-245.
20. Ordonez P, Quave CL, Reynolds WF, Varughese KI, Berry B, **Breen PJ**, Malagon O, Smeltzer MS, and Compadre CM, "Sesquiterpene Lactones from *Gynoxys verrucosa* and their Anti-MRSA Activity" *Journal of Ethnopharmacology* 2011; 137:1055-1059.
21. Singh AW, **Breen PJ**, Ghosh S, Kumar KS, Varughese KI, Crooks PA, Hauer-Jensen M, and Compadre CM, "Structural Modification of Tocotrienols to Improve Bioavailability," IN: *Tocotrienols: vitamin E beyond tocopherols*, Watson RR and Preedy VR (eds.), American Oil Chemists Society and Taylor & Francis, 2012, pp 359-370.
23. Jambhekar SS and **Breen PJ**. "Drug Dissolution: Significance of Physicochemical Properties and Physiological Conditions" *Drug Discovery Today* 2013; 18 (23/24): 1173-1184.
24. Compadre CM, Singh AW, Thakkar S, Zheng G, **Breen PJ**, Ghosh S, Kiaei M, Boerma M, Varughese KI, and Hauer-Jensen M. "Molecular Dynamics Guided Design of

- Tocoflexol: A New Radioprotectant Tocotrienol with Enhanced Bioavailability.” *Drug Development Research* 2014; 75(1): 10–22. DOI: 10.1002/ddr.21162
25. Cardenas VM, Breen PJ; Compadre CM; Delongchamp RR; Barone CP; Phillips MM; Wheeler JG. “The smoking habits of the family influence the uptake of e-cigarettes in US children.” *Annals of Epidemiology*, (2014). DOI: 10.1016/j.annepidem.2014.09.013 (accepted 28 September 2014).
  26. Krager KJ, Pineda EN, Kharade S, Kordsmeier M, Howard L, Breen PJ, Compadre CM, Hauer-Jensen M, and Aykin-Burns N. “Tocotrienol-rich fraction from rice bran demonstrates potent radiation protection activity.” *Evidence-Based Complementary and Alternative Medicine*, 2015 (2015), Article ID 148791, 9 pages, PMID: PMC4573888. Published online 2015 Aug 26:  
<http://dx.doi.org/10.1155/2015/148791>.
  27. Jambhekar SS and Breen PJ. “Cyclodextrins in Pharmaceutical Formulations I: Structure and Physicochemical Properties, Formation of Complexes, and Types of Complexes,” *Drug Discovery Today*, published online Nov. 17, 2015,  
<http://dx.doi.org/10.1016/j.drudis.2015.11.017>.
  28. Jambhekar SS and Breen PJ. “Cyclodextrins in Pharmaceutical Formulations II: Solubilization, Binding Constant, and Complexation Efficiency,” *Drug Discovery Today*, published online Nov. 16, 2015, <http://dx.doi.org/10.1016/j.drudis.2015.11.016>.
  29. Zaineb Albayati, Manjula Sunkara, Suzannah Schmidt-Malan, Melissa Karau, Andrew Morris, James Steckelberg, Robin Patel, **Philip Breen**, Mark Smeltzer, Grant Taylor, Kevyn Merten, William Pierce, and Peter Crooks. "USE OF A NOVEL BONE-TARGETING AGENT FOR THE ENHANCED DELIVERY OF VANCOMYCIN TO BONE," *Antimicrobial Agents and Chemotherapy*. [AAC01609-15R2], accepted for publication Dec. 5, 2015.

### Other Publications

Compadre, C.M. and **Breen, PJ**. Interview: “The Other Vitamin E: Recent Developments in Tocotrienols and Derivatives.” *J. American Oil Chemists Society*, 2014.

### Textbook

Jambhekar, SS and **Breen, PJ**. “**Basic Pharmacokinetics**” Pharmaceutical Press, London, 2009.

Jambhekar, SS and **Breen, PJ**. “**Basic Pharmacokinetics**,” 2<sup>nd</sup> edition, Pharmaceutical Press, London, April, 2012.

### Published Abstracts

1. Anderson, PJ, Zhou, X., **Breen, P.**, Gann, L., Logsdon, TW, Compadre, C., and Hiller, F.C. “Effect of Gender on Lung Uptake of Inhaled Albuterol.” *J. Aerosol Med.* 1997: 10:282.

2. Anderson, PJ, Zhou, X., **Breen, P.**, Gann, L., Logsdon, TW, Compadre, C., and Hiller, F.C. "Pulmonary Absorption of Inhaled Albuterol." *Am J Respir Crit Care Med* 1997; 155:A345.
3. Zhou, X., **Breen, P.**, Gann, L., Compadre, C., Hiller, F.C., and Anderson, PJ. "Pulmonary Absorption of Inhaled Albuterol." *Am J Respir Crit. Care Med* 157: A402, 1998.
4. Anderson, PJ, Zhou, X., **Breen, P.**, Gann, L., Compadre, C., and Hiller, F.C. "Pharmacokinetics of Inhaled Albuterol in Asthmatic Subjects." *Am J Respir Crit Care Med.* 159: A637, 1999
5. Anderson, PJ, Zhou, X., **Breen, P.**, Gann, L., Compadre, C., and Hiller, F.C. "Effect of a Holding Chamber on the Pharmacokinetics of Inhaled Albuterol in Normal Subjects." *J. Aerosol Med.* 12:114, 1999.
6. Hiller, F.C., Razmi, S., Zhou, X., **Breen, P.**, Gann, L., Compadre, C., and Anderson, PJ. "Pharmacokinetics of Albuterol Inhaled from Metered Dose Inhaler and Nebulizer by Asthmatic Subjects." *J. Aerosol Med.* 12:110, 1999.
7. Anderson PJ, **Breen PJ**, Joguparthi V, Gann LP, Compadre C, Hiller C. Pharmacokinetics of Inhaled Albuterol in Adults with Cystic Fibrosis. *Am J Respir. Crit. Care Med* 2002; 165:A286.

### Patents

1. D.L. Lattin, **P.J. Breen**, C.M. Compadre, E.K. Fifer, M.F. Slavik, H. Salari, and P.V. Engler. "Use of Quaternary Ammonium Compounds to Remove *Salmonella* Contamination from Meat Products," United States Patent No. 5,366,983. November 22, 1994.
2. Compadre Cesar, Breen Philip, Salari Hamid, Fifer E Kim, Lattin Danny, Slavik Mike, Li Yanbin, O'Brien Timothy: Broad Spectrum Prevention And Removal of Microbial Contamination of Food By Quaternary Ammonium Compounds. University of Arkansas. Oct, 23 1997: WO1997/038586
3. Compadre Cesar, Breen Philip, Salari Hamid, Fifer E Kim, Lattin Danny, Slavik Mike, Li Yanbin, O'Brien Timothy: Broad Spectrum Prevention And Removal of Microbial Contamination of Food By Quaternary Ammonium Compounds. University of Arkansas. Oct, 23 1997: CA2250761
4. C.M. Compadre, **P.J. Breen**, H. Salari, E.K. Fifer, D.L. Lattin, M.F. Slavik, and J. Li. "Improved Method for the Broad Spectrum Prevention and Removal of Contamination of Poultry and Meat Products by Quaternary Ammonium Compounds." United States Patent No. 5,855,940. Jan. 5, 1999.
5. Compadre Cesar, Breen Philip, Salari Hamid, Fifer E Kim, Lattin Danny, Slavik Mike, Li Yanbin, O'Brien Timothy: Broad Spectrum Prevention And Removal Of Microbial Contamination Of Food By Quaternary Ammonium Compounds. Univ Arkansas. May, 6 1999: EP0912101 (A1)

6. Cesar Compadre, Philip Breen, Hamid Salari, E Kim Fifer, Danny Lattin, Mike Slavik, Yanbin Li, Timothy O'Brien: 廣譜防止和清除食物微染. The University of Arkansas. Feb, 25 2000: HK1019692
- 7.. C.M. Compadre, **P.J. Breen**, H. Salari, E.K. Fifer, D.L. Lattin, T. O'Brien, M.F. Slavik and Yanbin. Li. "Method for the Broad Spectrum Prevention and Removal of Microbial Contamination of Food Products by Quaternary Ammonium Compounds." United States Patent No. 6,039,992. March 21, 2000.
8. Compadre Cesar, Breen Philip, Salari Hamid, Fifer E Kim, Lattin Danny L, Slavik Michael, Li Yanbin, O'Brien Timothy, Waldroup Amy L, Berg Thomas F: Concentrated Solution Of Quaternary Ammonium Compounds And Methods Of Use. University of Arkansas. Aug, 2 2001: WO2001/054502
9. Compadre Cesar, Breen Philip, Salari Hamid, Fifer E Kim, Lattin Danny L, Slavik Michael, Li Yanbin, O'Brien Timothy, Waldroup Amy L, Berg Thomas F: A Concentrated, Non-foaming Solution Of Quaternary Ammonium Compounds and Methods of Use. University Of Arkansas. Aug, 2 2001: CA2399801
10. Compadre Cesar, Breen Philip, Salari Hamid, Fifer E Kim, Lattin Danny L, Slavik Michael, Li Yanbin, O'Brien Timothy, Waldroup Amy L, Berg Thomas F: Concentrated Solution Of Quaternary Ammonium Compounds And Methods Of Use. Univ Arkansas. Dec, 4 2002: EP1261318 (A2)
11. Cesar Compadre, Philip Breen, Hamid Salari, E Kim Fifer, Danny L Lattin, Michael Slavik, Yanbin Li, Timothy O'Brien, Amy L. Waldroup, Thomas F Berg: 濃縮的季化合物溶液及其使用方法. The University of Arkansas. Apr, 11 2003: HK1048591
12. Cesar Compadre, Philip Breen, Hamid Salari, E Kim Fifer, Danny L Lattin, Michael Slavik, Yanbin Li, Timothy O'Brien, Amy L Waldroup, Thomas F Berg: Concentrated, Non-foaming Solution Of Quaternary Ammonium Compounds and Methods of Use. Jan, 30 2003: US20030021818
13. C.M. Compadre, **P.J. Breen**, H. Salari, E.K. Fifer, D.L. Lattin, M.F. Slavik, Yanbin. Li., T. O'Brien, Amy Waldroup, and Thomas Berg. "Concentrated Non-foaming Solution of Quaternary Ammonium Compounds and Methods of Use." United States Patent No. 6,864,269. March 8, 2005.
14. C.M. Compadre, **P.J. Breen**, H. Salari, E.K. Fifer, D.L. Lattin, T., M.F. Slavik and Yanbin. Li. "Broad Spectrum Prevention and Removal of Microbial Contamination of Food by Quaternary Ammonium Compounds." European Patent No. 05017265.9-2114, Oct.17, 2005.



15. Cesar Compadre, Philip Breen, Hamid Salari, E Kim Fifer, Danny L Lattin, Michael Slavik, Yanbin Li, Timothy O'Brien, Amy L Waldroup, Thomas F Berg. Concentrated, Non-foaming Solution of Quaternary Ammonium Compounds and Methods of Use. University of Arkansas. Oct, 27 2005: US20050239850
16. Cesar Compadre, Philip Breen, Hamid Salari, E Kim Fifer, Danny L Lattin, Michael Slavik, Yanbin Li, Timothy O'Brien, Amy Waldroup, Thomas F Berg. Concentrated, Non-foaming Solution of Quaternary Ammonium Compounds and Methods Of Use. University Of Arkansas. May, 26 2005: US20050113012
- #17. Cesar Compadre, Philip Breen, Hamid Salari, E Kim Fifer, Danny L Lattin, Michael Slavik, Yanbin Li, Timothy O'Brien, Amy L Waldroup, Thomas F Berg. Concentrated, Non-foaming Solution of Quaternary Ammonium Compounds and Methods of Use. University of Arkansas. Sep, 24 2009: US20090239912
18. C.M. Compadre, **P.J. Breen**, H. Salari, E.K. Fifer, D.L. Lattin, M.F. Slavik, Yanbin. Li., T. O'Brien, Amy Waldroup, and Thomas Berg. "Concentrated Non-foaming Solution of Quaternary Ammonium Compounds and Methods of Use." United States Patent No. 7,541,045. June 2, 2009.
19. Compadre, C. M., Hauer-Jensen, M, Philip J. Breen. Tocopherol derivatives and methods of use, WO/2011/153353, June 2, 2011.
20. Cesar Compadre, Philip Breen, Hamid Salari, E Kim Fifer, Danny L Lattin, Michael Slavik, Yanbin Li, Timothy O'Brien, Amy L Waldroup, Thomas F Berg. Concentrated, Non-foaming Solution of Quaternary Ammonium Compounds and Methods of Use. US20120071521, March 22, 2012
21. Cesar Compadre, Philip J. Breen, Martin Hauer-Jensen, Kottayil Varughese, K. Sree Kumar. Tocopherol derivatives and methods of use, US 20130158106 A1, June 20, 2013.
22. Cesar Compadre, Philip J. Breen, Nukhet Aykin-Burns, Martin Hauer-Jensen, Raul G. Enriquez, Sujay Kharade, Omar Malagon, Yadira Ordonez, Edgar Ojeda, Shradda Thakkar, E. Nathalie Pineda. Preparation and use of a composition for prevention and mitigation of the effects of radiation, provisional patent application 61/877/655, Sep 13, 2013.
23. Guangrong Zheng, Cesar Compadre, Philip Breen, Martin Hauer-Jensen, Peter Crooks, Methods for making tocoflexols and analogues thereof, PCT/US2013/030862, November 8, 2013.
24. Guangrong Zheng, Cesar Compadre, Philip Breen, Martin Hauer-Jensen, Peter Crooks, Methods for making tocoflexols and analogues thereof, Appl. # 14/402,792, 11/21/2014.

### **Pending Patents**

1. Compadre, C.M., Hauer-Jensen, M, **Breen PJ**, Tocopherol and tocotrienol analogues with enhanced bioavailability, PCT/US2011/038933, filed June 2, 2011.
2. Cesar Compadre, Philip J. Breen, Martin Hauer-Jensen, Kottayil Varughese, K. Sree Kumar. Tocopherol derivatives and methods of use. Application # 13/701/630, filed Jan 24, 2013.
3. Cesar Compadre, Philip J. Breen, Nukhet Aykin-Burns, Martin Hauer-Jensen, Raul G. Enriquez, Sujay Kharade, Omar Malagon, Yadira Ordonez, Edgar Ojeda, Shradda Thakkar, E. Nathalie Pineda. Preparation and use of a composition for prevention and mitigation of the effects of radiation, PCT request, filed Sep 15, 2014.

### **Funded Grants**

#### **Internal**

1. Berg, TF and **Breen, PJ**, "Acute Toxicity of Mitoxantrone: Effect of Chronobiology and Caloric Restriction," UAMS Medical Research Endowment Award, **\$8,000**.
2. **Phil Breen** (Co-PI), "Pharmacokinetics and Pharmacodynamics of  $\beta$ -agonists," UAMS Pulmonary Development Fund, **\$315,000** (\$45,000/yr, from 1994-2000).
3. **Phil Breen** (Co-PI), "Pharmacokinetics and Pharmacodynamics of Salmeterol in Plasma after Aerosol Inhalation," U.A.M.S. Pulmonary Development Fund, **\$30,000/ year**, 10% effort, 2001-2004.
4. Krager KJ, Kordsmeier M, , Howard L, **Breen PJ**, Compadre CM, Hauer-Jensen M, and Aykin-Burns N. "Development of RBODD, a Byproduct of Rice Production, as a Potential Therapeutic Agent". Arkansas Biosciences Institute, \$35,000/ year, 2013-2015.

#### **External**

1. Berg, TF and **Breen, PJ**, "Acute Toxicity of Gancyclovir: Effect of Dietary Restriction and Chronobiology," National Center for Toxicological Research, Jefferson, AR, 1990-1991, **\$90,000**.
2. Lattin, DL, **Breen, PJ**, et al, "Studies of Chemical Agents in Poultry," U.S. Department of Agriculture, **\$325,000** (over 7 years, from 1990-1996).
3. Nolte, T., Compadre, C., and **Breen, P.J.**, "Development of a 3-D Model to Show the Effects of Weightlessness on Drug Kinetics," Arkansas Space Grant Consortium, 1996, **\$8,978**.
4. **Phil Breen (PI)**, "Quaternary Ammonium Compounds: Basic and Applied Studies to Prevent Bacterial Attachment," USDA/FSIS, 1997, **\$45,000**.
5. **Breen, PJ (PI)**, "Use of cetylpyridinium chloride as an antimicrobial agent on poultry and other food products," Arkansas Science and Technology Authority, 1997, **\$50,000**.
6. Sumpter, J., Compadre, C., and **Breen,P.J.**, "An Anatomically Accurate Model of Esophageal Transport," Arkansas Space Grant Consortium, 1998, **\$6,500**.
7. Sumpter, J., Compadre, C., and **Breen, P.J.**, "Virtual Reality Simulation of Gastrointestinal Motility under Conditions of Microgravity," NASA Graduate Student Research Fellowship, 8/98-7/01, **\$66,000**.

8. Compadre, CM and **Breen, PJ**, "Strategies to prevent and remove microbial contamination of food," U.S. Department of Agriculture, N.R.I.C.G.P., 1999, **\$70,000**.
9. "Simulation of the Effect of Microgravity in Drug Pharmacokinetics," Arkansas Space Grant Consortium, **\$4,000**, 1 year, 10% effort, grant year ended Feb 2003.
10. **Breen, P.J.** "Tobacco Prevention and Cessation", Consortium Agreement between La Casa Health Network, Inc. and UAMS. **\$12,000**, 1 year, through June, 2004.
11. Compadre, CM and **Breen, PJ**, "Countermeasures for Acute Respiratory Distress Produced by Lunar Dust", Arkansas Space Grant consortium, 2006-7, \$3000, co-investigator.
12. Grant-writing support for SBIR "Development of Vitamin E analogs with Enhanced Oral Absorption Properties," **P.J. Breen** and C.M. Compadre. Arkansas Science and Technology Authority, TTAG grant, **\$5000**.
13. "Advanced Drug Development of Gamma-Tocotrienol as a Radiation Countermeasure in Rhesus Macaque Non-Human Primates" Hauer-Jensen M, Kumar S, Kulkarni, S, **Breen PJ**, and Hendrickson H. Armed Forces Radiation Research Institute #38691, NCE on HU0001-10-1-0004 (#710014), July 1, 2011, **10 % salary relief**.
14. **Breen, PJ (PI)**, Compadre CM, et al, "Safety and Efficacy Studies of Tocoflexol, a Newly Designed Tocol," Center for Clinical Translational Research (CCTR), University of Arkansas for Medical Sciences, **\$50,000**, Oct 1, 2011-Sep 30, 2012.
15. **Breen, PJ (PI)**, Compadre CM, et al, "Radiomitigation using DG3", Seed Capital Investment Program, Arkansas Science and Technology Authority, **\$50,000**, Jan 1 – Dec 31, 2016.

#### **Graduate Student Committee Member**

**Haijuan Yang**, M.S., 1995.

**Todd Logsdon**, M.S., 1995.

**Nasser Nyamweya**, M.S., 1996.

**James Sumpter**, Ph.D., 2001.

**Faith Hartsfield**, M.S., 2006.

**Awantika Singh**, Ph.D. Dissertation: "The development of tocoflexol", successfully defended Oct. 2013.

**Nathalie Pineda Sotomayor**, M.S. thesis, successfully defended 2014.

**Shradda Thakkar**, Ph.D. Dissertation: "Applications of structure-based drug design to general high affinity immunotherapy and to identify novel inhibitors of LOX-1 to treat atherosclerosis", successfully defended Dec. 2014

**Jai Shankar K. Yadlapalli**, Ph.D. Dissertation: "Preclinical Evaluation of the 6-O-Sulfate Ester of Morphine for the Treatment of Multimodal Acute and Chronic Pain", successfully defended 2015.

**Zheng Chen**, Ph.D., 2015

**Kevin Howk**, in progress

**Anqi Wang**, in progress

**Gauri Lamture**, in progress

#### **Major Advisor for Graduate Student Thesis/ Dissertation**

M.S. Thesis: **Andronica Handie**, "Development, Validation, and Application of Analytical

Methods for the Determination of Cetylpyridinium Chloride in Biological Matrices,” successfully defended July, 1999.

M.S. Thesis: **Vijay Joguparthi**, “Pharmacokinetics and Pharmacodynamics of (*R, S*)-Albuterol in Adult Cystic Fibrosis Patients,” successfully defended Sep. 2002.

### **Service Activities**

Secretary of the Faculty, College of Pharmacy, 2008-2012.

Team Leader, Self-study for the College’s ACPE Accreditation, 2012-2013.

Academic Senate Council, representative for College of Pharmacy, 2014-2015

Chair, College of Pharmacy Curriculum Committee, 2014-present

Portfolio committee, 2015- present

Admission Committee, present

Assessment Committee, present