Corey R. Hopkins, Ph.D.

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College of Pharmacy
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EDUCATION

1995 – 2001	Ph.D., University of Pittsburgh, Pittsburgh, PA Advisor: Professor Peter Wipf Thesis: Studies toward the total synthesis of naphthyridinomycin/ bioxalomycin antitumor antibiotics
1987 – 1992	B.S., Chemistry, Indiana University, Bloomington, IN

PROFESSIONAL EXPERIENCE

06/16 – present	**Associate Professor (tenure-track)** **College of Pharmacy, Department of Pharmaceutical Sciences** **University of Nebraska Medical Center**
05/11 – 06/16	**Assistant Professor of Chemistry** **Assistant Professor of Pharmacology** **Associate Director of Medicinal Chemistry, Vanderbilt Center for Neuroscience Drug Discovery** **Co-Director, Vanderbilt Specialized Chemistry Center for Accelerated Probe Development** (*Medicinal Chemistry, Drug Discovery, Parkinson's Disease, Chemical Biology*)
08/08 – 05/11	**Assistant Professor of Pharmacology** **Associate Director of Medicinal Chemistry, Vanderbilt Program in Drug Discovery** **Co-Director, Vanderbilt Specialized Chemistry Center for Accelerated Probe Development** (*Medicinal Chemistry, Drug Discovery, Parkinson's Disease, Chemical Biology*)
08/06 – 07/08	**Senior Research Investigator/Project Team Leader** **(CNS Medicinal Chemistry Department)** Sanofi-Aventis Pharmaceuticals, Bridgewater, NJ (*Neuroscience, Multiple Sclerosis, Asthma*)

05/05 – 07/06	**Scientist/Project Team Leader** **(Skeletal & Inflammatory Diseases Medicinal Chemistry Department)** Procter & Gamble Pharmaceuticals, Cincinnati, OH (*Osteoporosis, Pain, Inflammation, Rheumatoid Arthritis*)
10/01 – 05/05	**Senior Scientist/Project Team Leader** **(Medicinal Chemistry Department)** Aventis Pharmaceuticals/Sanofi-Aventis Pharmaceuticals, Bridgewater, NJ (*Neuroscience, Asthma, Rheumatoid Arthritis, Depression*)
08/95 – 09/01	**Graduate Research Assistant with Professor Peter Wipf** University of Pittsburgh, Pittsburgh, PA (*Total synthesis of complex natural products, methodology development, analog synthesis, medicinal chemistry*)

TEACHING EXPERIENCES

2016	**Introduction to Allosteric Modulators** Short Course as part of the 14th Annual Discovery on Target, Boston, MA, September 2016.
2015	**Allosteric Modulators of GPCRs (PAMs and NAMs)** Short Course as part of the 12th Mastering Medicinal Chemistry, Boston MA, June 2015.
2013	**Allosteric Modulators of GPCRs** Short Course as part of the 11th Annual Discovery on Target, Boston MA, September 2013.
2009 – present	**Research Assistant Professor of Pharmacology** Vanderbilt University Medical Center Pharm 327 *Modern Drug Discovery* IGP 300B: *Principles of Organic Chemistry and Small Molecule Design for Biologists*
1995 – 2000	**Graduate Teaching Assistant** Organic Chemistry I & II Organic Chemistry Laboratory General Chemistry University of Pittsburgh (*Organic Laboratory, Organic Chemistry Lecture*)

EDITORIAL POSITIONS

- Invited Session Chair of "GPCR-Targeted Therapeutics: Progressing Drug Candidates" at the 11th Annual Discovery on Targets, Boston, MA, September 25th, 2013.
- Managing Editor, *ACS Chemical Neuroscience*, 2011–onward
- Volume Editor, *Topics in Medicinal Chemistry, "Novel Therapeutic Approaches to the Treatment of Parkinson's Disease: An Overview and Update"*, 2013–2014.
- Associate Editor, *BMC Pharmacology and Toxicology*, 2012 – onward.
- Editorial Board Member, *Advances in Parkinson's Disease,* 2012 – onward.
- Editorial Advisory Board, *International Journal of Drug Design & Discovery*, 2009–onward
- International Advisory Board, *Drug Discovery and Therapy World Congress*, Boston, MA, 2013
- Guest Editor, *Curr. Top. Med. Chem.*, issue on Recent Progress on Modulation of mGluRs (2010/2011)
- Member International Advisory Board, 4th *International Conference on Drug Discovery & Therapy*, February 12th – 15th, 2012, Dubai, UAE
- Member International Advisory Board, *3rd International Conference on Drug Discovery & Therapy*, February 7th – 10th, 2011, Dubai, UAE
- Organizing Secretary, *2nd International Conference on Drug Discovery & Therapy*, Feb. 1st – 4th, 2010, Dubai, UAE – Central Nervous System (Discovery Section).

REVIEW POSITIONS

- Reviewer – Michael J. Fox Foundation for Parkinson's Research, 2009–onward
- Reviewer – Alzheimer's Association, 2011–onward
- Reviewer – The W. Garfield Weston Foundation, 2013–onward
- Special Society Reviewer – *Alzheimer's & Dementia: the Journal of the Alzheimer's Association*, 2013–onward.

PROFESSIONAL ORGANIZATIONS

American Chemical Society	Organic Chemistry Division Medicinal Chemistry Division

INTRAMURAL ACTIVITIES

Thesis Committees:

Rene Raphemot	Pharmacology	2012-2014, Member
Darwin Fu	Chemistry	2015- , Member
Krystian Kozek	Pharmacology	2015- , Member

FUNDING

Active:

5R01MH107399 NIMH
"Development of an *in vivo*, brain-penetrant GIRK1/2 potassium channel activator, Co-PI; 06/15/2015 – 02/28/2018.

5R01DK103658 NIDDK
"Optimization of novel inhibitors of TRPC5 as anti-proteinuric therapeutics", PI; 09/15/2014 – 06/30/2019.

MJFF Therapeutic Pipeline Program "Optimization of dopamine D4 antagonists for the treatment of L-DOPA-induced dyskinesias (LIDs)", PI, 02/01/2015 – 01/31/2016.

Pending:

1R01MH110389 NIMH
"Optimization of a metabotropic glutamate receptor 7 positive allosteric modulator", Co-PI (Niswender, C., Vanderbilt), 07/01/2016 – 06/30/2019.

1R21AI128418 NIAID
"Development of small molecule mosquitocides for controlling the primary vector of Zika virus, Aedes aegypti", Co-PI (Piermarini, P., Ohio State; Denton, J., Vanderbilt), 12/01/2016 – 11/30/2018.

PUBLICATIONS

Primary Literature

70. "Identification of Metabotropic Glutamate Receptor 7 as a Therapeutic Target for Rett Syndrome: Rescue of Deficits in Hippocampal Long Term Potentiation and Cognition Through Allosteric Modulation", Klar R.; Gogliotti, R. G.; Zamorano, R.; Walker, A. G.; Blobaum, A. L.; Engers, D. W.; Hopkins, C. R.; Daniels, J. S.; Lindsley, C. W.; Xiang, Z.; Conn, P. J.; Niswender, C. M.* *Sci. Transl. Med.* **2016**, *Submitted for Publication*.

69. "An insecticide resistance-breaking mosquitocide targeting inward rectifier potassium channels in vectors of Zika virus and malaria", Swale, D. R.; Engers, D. W.; Bollinger, S. R.; Gross, A.; Inocente, E. A.; Days, E.; Kanga, F.; Johnson, R. M.; Yang, L.; Bloomquist, J. R.; Hopkins, C. R.; Piermarini, P. M.; Denton, J. S.* *Nat. Commun.* **2016**, Manuscript #: NCOMMS-16-17553. *Submitted for Publication*.

68. "Development of VU0418506, a positive allosteric modulator that differentiates metabotropic glutamate receptor 4 (mGlu4) homomeric receptors from mGlu2/4 heteromers", Niswender, C. M.; Jones, C. K.; Lin, X.; Bubser, M.; Thompson-Gray, A.; Blobaum, A. L.; Engers, D. W.; Rodriguez, A. L.; Loch, M. T.; Daniels, J. S.; Lindsley, C. W.; Hopkins, C. R.; Javitch, J. A.; Conn, P. J.* *ACS Chem. Neurosci.* **2016**, *Just Accepted*. DOI: 1021/acschemneuro.6b00036.

67. "Allosteric Modulator of Mas-Related G-Protein-Coupled Receptor X1 (MrgprX1) Inhibits Persistent Pain", Li, Z.; Tseng, P.-Y.; Tiwari, V.; Xu, Q.; Wang, Y.; Han, L.; Cui, Y.; He, S.-Q.; Sun, S.; Zheng, Q.; Cheng, Y.; Huang, J.; Geng, Y.; Xiao, B.; Hopkins, C. R.; Guan, Y.*; Dong, X.* *eLife* **2016**, *Submitted for Publication*, Manuscript #: 29-02-2016-RA-elife-15678.

66. "ML418: The first selective, sub-micromolar pore blocker of Kir7.1 potassium channels", Swale, D.; Kurata, H.; Kharade, S.; Sheehan, J.; Raphemot, R.; Voigtritter, K.; Figueroa, E.; Meiler, J.; Blobaum, A.; Lindsley, C.; Hopkins, C. R.*; Denton, J. S.* *ACS Chem. Neurosci.* **2016**, *Accepted for publication.* DOI: 10.1021/acschemneuro.6b00111.

65. "Discovery and characterization of a novel series of *N*-phenylsulfonyl-1*H*-pyrrole picolinamides as positive allosteric modulators of the metabotropic glutamate receptor 4 ($mGlu_4$)", Gogliotti, R. D.; Blobaum, A. L.; Morrison, R. M.; Daniels, J. S.; Salovich, J. M.; Cheung, Y.-Y.; Rodriguez, A. L.; Loch, M. T.; Conn, P. J.; Lindsley, C. W.; Niswender, C. M.; Hopkins, C. R.* *Bioorg. Med. Chem. Lett.* **2016**, *26*, 2984-2987. DOI: 10.1016/j.bmcl.2016.05.029.

64. "Discovery and optimization of a novel series of highly CNS penetrant M_4 PAMs based on a 5,6-dimethyl-4-(piperidin-1-yl)thieno[2,3-*d*]pyrimidine core", Wood, M. R.; Noetzel, M. J.; Engers, J. L.; Bollinger, K. A.; Melancon, B. J.; Tarr, J. C.; Han, C.; West, M.; Gregro, A. R.; Lamsal, A.; Chang, S.; Ajmera, S.; Smith, E.; Chase, P.; Hodder, P. S.; Bubser, M.; Jones, C. K.; Hopkins, C. R.; Emmitte, K. A.; Niswender, C. M.; Wood, M. W.; Duggan, M. E.; Conn, P. J.; Bridges, T. M.; Lindsley, C. W.* *Bioorg. Med. Chem. Lett.* **2016**, *26*, 3029-3033. DOI: 10.1016/j.bmcl.2016.05.010.

63. "Discovery, Synthesis and Pre-Clinical Characterization of *N*-(3-chloro-4-fluorophenyl)-1*H*-pyrazolo[4,3-*b*]pyridin-3-amine (VU0418506), a novel positive allosteric modulator of the metabotropic glutamate receptor 4 ($mGlu_4$)", Engers, D. W.; Blobaum, A. L.; Gogliotti, R. D.; Cheung, Y.-Y.; Salovich, J. M.; Garcia-Barrantes, P. M.; Daniels, J. S.; Morrison, R.; Jones, C. K.; Soars, M. G.; Zhuo, X.; Hurley, J.; Macor, J. E.; Bronson, J. J.; Conn, P. J.; Lindsley, C. W.; Niswender, C. M.; Hopkins, C. R.* *ACS Chem. Neurosci.* **2016**, *Accepted for Publication*. DOI: 10.1021/acschemneuro.6b00035.

62. "Bone morphogenetic protein signaling promotes tumorigenesis in a murine model of high-grade glioma", Hover, L. D.; Owens, P.; Munden, A.; Chambless, L.; Hong, C. C.; Hopkins, C. R.; Moses, H. L.; Abel, T. W. *Neuro Oncol.* **2015**, *First Published online: December 18, 2015.* DOI: 10.1093/neuonc/nov310.

61. "Discovery of 3-aminopicolinamides as metabotropic glutamate receptor subtype 4 ($mGlu_4$) positive allosteric modulator warheads engendering CNS exposure and *in vivo* efficacy", Gogliotti, R.; Engers, D. W.; Garcia-Barrantes, P.; Panarese, J. D.; Gentry, P.; Blobaum, A. L.; Morrison, R. D.; Daniels, J. S.; Thompson, A. D.; Jones, C. K.; Conn, P. J.; Niswender, C. M.; Lindsley, C. W.; Hopkins, C. R.* *Bioorg. Med. Chem. Lett.* **2016**, *26*, 2915-2919. DOI: 10.1016/j.bmcl.2016.04.041.

60. "Synthesis and characterization of a series of chiral alkoxymethyl morpholine analogs as dopamine receptor 4 (D_4R) antagonists", Witt, J. O.; McCollum, A. L.; Hurtado, M. A.; Huseman, E. D.; Jeffries, D. E.; Temple, K. J.; Plumley, H. C.; Blobaum, A. L.; Lindsley, C. W.; Hopkins, C. R.* *Bioorg. Med. Chem. Lett.* **2016**, *26*, 2481-2488. DOI: 10.1016/j.bmcl.2016.03.102.

59. "Advancing biological understanding and therapeutics discovery with small-molecule probes", Schreiber, S. L.; Kotz, J. D.; Li, M.; Aubé, J.; Austin, C. P.; Reed, J. C.; Rosen, H.; White, E. L.; Sklar, L. A.; Lindsley, C. W.; Alexander, B. R.; Bittker, J.; Clemons, P. A.; De Souza, A.; Foley, M. A.; Palmer, M.; Shamji, A. F.; Wawer, M. J.; McManus, O.; Wu, M.; Zou, B.; Yu, H.; Golden, J. E.; Schoenen, F. J.; Simeonov, A.; Jadhav, A.; Jackson, M. R.; Pinkerton, A. B.; Chung, T. D. Y.; Griffin, P. R.; Cravatt, B. F.; Chung, D.-H.; Jonsson, C. B.; Noah, J. W.; Severson, W. E.; Ananthan, S.; Edwards, B.; Oprea, T. I.; Conn, P. J.; Hopkins, C. R.; Wood, M. R.; Stauffer, S. R.; Emmitte, K. A.; Brady, L. S.; Driscoll, J.; Li, I. Y.; Loomis, C. R.;

Margolis, R. N.; Michelotti, E.; Perry, M. E.; Pillai, A.; Yao, Y. *Cell*, **2015**, *161*, 1252-1265. DOI: *10.1016/j.cell.2015.05.023*.

58. "Activation of metabotropic glutamate receptor 7 is required for induction of long term potentiation at SC-CA1 synapses in the hippocampus", Klar, R.; Walker, A. G.; Ghose, D. Grueter, B. A.; Engers, D. W.; Hopkins, C. R.; Lindsley, C. W.; Xiang, Z.; Conn, P. J.; Niswender, C. M.* *J. Neurosci*. **2015**, *35*, 7600-7615. DOI: 10.1523/JNEUROSCI.4543-14.2015.

57. "Synthesis and structure-activity relationships of a series of 4-methoxy-3-(piperidin-4-yl)oxy benzamides as novel inhibitors of the presynaptic choline transporter", Bollinger, S. R.; Engers, D. W.; Ennis, E. A.; Wright, J.; Locuson, C. W.; Lindsley, C. W.; Blakely, R. D.; Hopkins, C. R.* *Bioorg. Med. Chem. Lett.* **2015**, *25*, 1757-1760. DOI: 10.1016/j.bmcl.2015.02.058.

56. "Pharmacological stimulation of metabotropic glutamate receptor type 4 in a rat model of Parkinson's disease and L-DOPA-induced dyskinesia: comparison between a positive allosteric modulator and an orthosteric agonist", Iderberg, H.; Maslava, N.; Thompson, A. D.; Bubser, M.; Niswender, C. M.; Hopkins, C. R.; Lindsley, C. W.; Conn, P. J.; Jones, C. K.*; Cenci, M. A.* *Neuropharmacology* **2015**, *95*, 121-129. DOI: 10.1016/j.neuropharm.2015.02.023.

55. "Identification and characterization of ML352: A novel, noncompetitive inhibitor of the presynaptic choline transporter", Ennis, E. A.; Wright, J.; Retzlaff, C. L.; McManus, O. B.; Lin, Z.; Huang, X.; Wu, M.; Daniels, J. S.; Lindsley, C. W.; Hopkins, C. R.; Blakely, R. D.* *ACS Chem. Neurosci.* **2015**, *6*, 417-427. DOI: 10.1021/cn5001809.

54. "Discovery and characterization of 2-(cyclopropanesulfonamido)-*N*-(2-ethoxyphenyl)benzamide, ML382: a potent and selective positive allosteric modulator of MrgX1", Wen, W.; Wang, Y.; McManus, O. B.; Wu, M.; Li, M.; Lindsley, C. W.; Dong, X.*; Hopkins, C. R.* *Chem. Med. Chem.* **2015**, *10*, 57-61. DOI: 10.1002/cmdc.201402277. PMID: 25209672.

53. "Discovery and characterization of a potent and selective inhibitor of *Aedes aegypti* inward rectifier potassium channels", Raphemot, R.; Rouhier, M. F.; Swale, D. R.; Days, E.; Weaver, C. D.; Lovell, K. M.; Konkel, L. C.; Engers, D. W.; Bollinger, S. R.; Hopkins, C. R.; Piermarini, P. M.; Denton, J. S. *PLoS One* **2014**, *9*, e110772. DOI: 10.1371/journal.pone.0110772.

52. "Identification of positive allosteric modulators VU0155094 (ML397) and VU0422288 (ML396) reveals new insights into the biology of metabotropic glutamate receptor 7", Jalan-Sakrikar, N.; Field, J. R.; Klar, R.; Mattmann, M. E.; Gregory, K. J.; Zamorano, R.; Engers, D. W.; Bollinger, S. R.; Weaver, C. D.; Days, E. L.; Utley, T. J.; Hurtado, M.; Rigault, D.; Acher, F.; Walker, A. G.; Melancon, B. J.; Wood, M. R.; Lindsley, C. W.; Conn, P. J.; Xiang, X.; Hopkins, C. R.; Niswender, C. M.* *ACS Chem. Neurosci.* **2014**, *5*, 1221-1237. DOI: *10.1021/cn5000153z*. PMID: 25225882.

51. "Inhibition of BMP Signaling Suppresses Metastasis in Mammary Cancer", Owens, P.; Pickup, M. W.; Novitskiy, S. V.; Giltnane, J. M.; Gorska, A. E.; Hopkins, C. R.; Hong, C. C.*; Moses, H. L.* *Oncogene* **2014**, *Advance online publication, 7 July 2014; DOI:* 10.1038/onc.2014.189. PMID: 24998846.

50. "Specific Activin Receptor-Like Kinase 3 Inhibitors Enhance Liver Regeneration", Tsugawa, D.; Oya, Y.; Masuzaki, R.; Ray, K.; Engers, D. W.; Dib, M.; Ho, K.; Do, N.; Kuramitsu, K.; Yu, P.; Bloch, K.; Lindsley, C. W.; Hopkins, C. R.; Hong, C. C.; Karp, S.* *J. Pharmacol. Exper. Ther.* **2014**, *351*, 549-558. DOI: *10.1124/jpet.114.216903.* PMID: 25271257.

49. "Chemical modulation of mutant $mGlu_1$ receptors derived from deleterious *GRM1* mutations found in schizophrenics: development of novel $mGlu_1$ PAMs via 'double molecular switch' of an $mGlu_4$ PAM chemotype", Cho, H. P.; Garcia-Barrantes, P. M.; Brogan, J. T.; Hopkins, C. R.; Niswender, C. M.; Morrison, R. D.; Bubser, M.; Daniels, J. S.; Jones, C. K.; Conn, P. J.; Lindsley, C. W.* *ACS Chem. Biol.* **2014**, *9*, 2334-2346. DOI: 10.1021/cb5000560h. PMID: 25137254

    - For a highlight see: from the SCENEs, "Small Molecules Reactive Receptor Linked With Schizophrenia" *Chem. & Eng. News* **2014**, *92* (39), 32.

48. "Discovery and characterization of ML398, a potent and selective chiral morpholine-based antagonist of the dopamine 4 (D4) receptor with in vivo activity in a cocaine-induced hyperlocomotion assay", Berry, C. B.; Bubser, M.; Jones, C. K.; Hayes, J. P.; Wepy, J. A.; Locuson, C. W.; Daniels, J. S.; Lindsley, C. W.; Hopkins, C. R.* *ACS Med. Chem. Lett.* **2014**, *5*, 1060-1064. DOI: 10.1021/ml500267c. PMID: 25221667.

47. "TRPC5 inhibition protects against kidney filter damage", Schaldecker, T.; Kim, S.; Tarabanis, C.; Tian, D.; Hakroush, S.; Castonguay, P.; Ahn, W.; Wallentin, H.; Heid, H.; Hopkins, C. R.; Lindsley, C. W.; Riccio, A.; Buvall, L.; Weins, A.; Greka, A.* *J. Clin. Invest.* **2013**, *123*, 5298-5309. DOI: *10.1172/JCI71165*. PMID: 24231357.

    - *Highlighted in Science Daily: "Blocking signal-transmitting cellular pores may prevent kidney damage", Nov. 15, 2013. (http://www.sciencedaily.com/releases/2013/11/131115130157.htm)*
    - *EurekaAlert: Blocking signal-transmitting cellular pores may prevent kidney damage", Nov. 15, 2013. (http://www.eurekalert.org/pub_releases/2013-11/mgh-bsc110713.php)*
    - *Technology.Org: "Researchers identify a key molecule involved in kidney failure", November 17, 2013. (http://www.technology.org/2013/11/17/damage-control/)*
    - *Manuscript highlighted in Nature Reviews Drug Discovery: Flemming, A. "Targeting a Faulty Filter"* **2014**, *13*, 101. DOI: 10.1038/nrd4234.

46. "Reversible Inhibitors of Regulators of G-protein Signaling Identified in a High-throughput Cell-based Calcium Signaling Assay", Storaska, A. J.; Mei, J. P.; Wu, M.; Wade, S. M.; Blazer, L. L.; Sjorgen, B.; Lindsley, C. W.; Hopkins, C. R.; McManus, O.; Neubig, R. R.* *Cell. Signaling* **2013**, *25*, 2848-2855. DOI: *10.1016/j.cellsig.2013.09.007*. PMID: 24041654.

45. "Eliciting renal failure in mosquitoes with a small-molecule inhibitor of inward-rectifying potassium channels", Raphemot, R.; Rouhier, M. F.; Hopkins, C. R.; Gogliotti, R. D.; Lovell, K.; Hine, R. M.; Beyenbach, K. W.; Denton, J. S.*; Piermarini, P. M.* *PLoS ONE* **2013**, *8(5)*, e64905. DOI: *10.1371/journal.pone.0064905*.

44. "Dynamic Subunit Stoichiometry Confers a Progressive Continuum of Pharmacological Sensitivity by KCNQ Channels", Yu, H.; Lin, Z.; Mattmann, M. E.; Zou, B.; Terrenoire, C.;

Wu, M.; McManus, O. B.; Kass, R. S.; Lindsley, C. W.; Hopkins, C. R.*; Li, M.* *Proc. Nat. Acad. Sci.* **2013***, 110*, 8732-8737. DOI: *10.1073/pnas.1300684110.*

43. "Synthesis and structure-activity relationships of a novel and selective bone morphogenetic protein receptor (BMP) inhibitor derived from the pyrazolo[1,5-*a*]pyrimidine scaffold of Dorsomorphin: The discovery of ML347 as an ALK2 versus ALK3 selective MLPCN probe", Engers, D. W.; Frist, A. Y.; Lindsley, C. W.; Hong, C. C.; Hopkins, C. R.* *Bioorg. Med. Chem. Lett.* **2013**, *23(11)*, 3248-3252. DOI: 10.1016/j.bmcl.2013.03.113.

42. "Further exploration of M_1 allosteric agonists: Subtle structural changes abolish M_1 allosteric agonism and result in pan-mAChR orthosteric antagonism", Sheffler, D. J.; Sevel, C.; Le, U.; Lovell, K. M.; Tarr, J. C.; Carrington, S. J. S.; Cho, H. P.; Digby, G. J.; Niswender, C. M.; Conn, P. J.; Hopkins, C. R.; Wood, M. R.; Lindsley, C. W.* *Bioorg. Med. Chem. Lett.* **2013**, *23*, 223-227. DOI: *10.1016/j.bmcl.2012.10.132*.

41. "Discovery of a selective M_4 positive allosteric modulator based on the 3-amino-thieno[2,3-*b*]pyridine-2-carboxamide scaffold: Development of ML253, a potent and brain penetrant compound that is active in a preclinical model of schizophrenia", Le, U.; Melancon, B. J.; Bridges, T. M.; Vinson, P. N.; Utley, T. J.; Lamsal, A.; Rodriguez, A. L.; Venable, D.; Sheffler, D. J.; Jones, C. K.; Blobaum, A. L.; Wood, M. R.; Daniels, J. S.; Conn, P. J.; Niswender, C. M.; Lindsley, C. W.; Hopkins, C. R.* *Bioorg. Med. Chem. Lett.* **2013**, *23*, 346-350. DOI: *10.1016/j.bmcl.2012.10.073*

40. "Identification and Characterization of a Compound that Protects Cardiac Tissue From Human Ether-à-go-go-Related Gene (hERG)-Related, Drug-Induced Arrhythmias", Potet, F.; Lorinc, A. N.; Chaigne, S.; Hopkins, C. R.; Venkataraman, R.; Stepanovic, S. Z.; Lewis, L. M.; Days, E.; Sidorov, V. Y.; Engers, D. W.; Zou, B.; Afshartous, D.; Balser, J. R.; Li, M.; Baudenbacher, F. J.; Lindsley, C. W.; Weaver, C. D.; Kuperschmidt, S.* *J. Biol. Chem.* **2012**, *287*, 39613-39625. DOI: *10.1074/jbc.M112.380162*.

39. "The hereditary spastic paraplegia proteins spartin and maspardin interact in a pathway that regulates BMP signaling", Clowes, V. E.; Edwards, T. L.; Angus, K. L.; Warren, J.; Harbour, M. E.; Hopkins, C. R.; Hong, C. C.; Blackstone, C.; Hanna, M.; Reid, E.* *J. Med. Genet.*, **2012**, *49*, S94.

38. "DMH1, a novel BMP small molecule inhibitor, increases cardiomyocyte progenitors and promotes cardiac differentiation in mouse embryonic stem cells", Ao, A.*; Hao, J.; Hopkins, C. R.; Hong, C. C. *PLoS ONE* **2012**, *7*, e41627. DOI: *10.1371/journal.pone.0041627*. PMID: 22848549.

37. "Identification of (*R*)-*N*-(4-(4-methoxyphenyl)thiazol-2-yl)-1-tosylpiperidine-2-carboxamide, ML277, as a novel, potent and selective $K_v7.1$ (KCNQ1) potassium channel activator", Mattmann, M. E.; Yu, H.; Lin, Z.; Xu, K.; Huang, X.; Long, S.; Wu, M.; McManus, O. B.; Engers, D. W.; Le, U. M.; Li, M.*; Lindsley, C. W.; Hopkins, C. R.* *Bioorg. Med. Chem. Lett.* **2012**, *22*, 5936-5941. DOI: *10.1016/j.bmcl.2012.07.060*.

36. "Discovery of a Series of 2-phenyl-*N*-(2-(pyrrolidin-1-yl)phenyl)acetamides as Novel Molecular Switches that Modulate Modes of $K_v7.2$ (KCNQ2) Channel Pharmacology: Identification of (*S*)-2-phenyl-*N*-(2-(pyrrolidin-1-yl)phenyl)butanamide (ML252) as a Potent, Brain Penetrant $K_v7.2$ Channel Inhibitor", Cheung, Y.-Y.; Yu, H.; Xu, K.; Zou, B.; Wu, M.;

McManus, O. B.; Li, M.*; Lindsley, C. W.; Hopkins, C. R.* *J. Med. Chem.* **2012**, *55*, 6975-6979. DOI: *10.1021/jm300700v*. PMID: 22793372.

35. "Iterative experimental and virtual high-throughput screening identifies metabotropic glutamate receptor subtype 4 positive allosteric modulators", Mueller, R.; Dawson, E. S.; Niswender, C. M.; Butkiewicz, M.; Hopkins, C. R.; Weaver, C. D.; Lindsley, C. W.; Conn, P. J.; Meiler, J.* *J. Mol. Model.* **2012**, *18*, 4437-4446. DOI: *10.1007/s00894-012-1441-0*. PMID: 22592386.

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14. Conn, P. J.; Lindsley, C. W.; Hopkins, C. R.; Weaver, C. D.; Gogliotti, R. D.; Engers, D. W. *Substituted Substituted 1,1,3,3-tetraoxidobenzo[d][1,3,2]dithiazoles as mGluR4 allosteric potentiators, compositions, and methods of treating neurological dysfunction*. U. S. Patent Appl. US 2011/0319429, **2011**; 67 pp.

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10. Conn, P. J.; Lindsley, C. W.; Hopkins, C. R.; Weaver, C. D.; Niswender, C. M.; Engers, D. W. *Substituted dioxopiperidines and dioxopyrrolidines as mGluR4 allosteric potentiators, compositions, and methods of treating neurological dysfunction*, US Pat. Appl. Publ. 2011/0124663, **2011**; 48 pp.

9. Conn, P. J.; Lindsley, C. W.; Hopkins, C. R.; Weaver, C. D.; Niswender, C. M.; Cheung, Y.-Y. *Aryl and Heteroaryl Sulfones as mGluR4 Allosteric Potentiators, Compositions, and Methods of Treating Neurological Dysfunction* PCT Int. Appl. 2011/057208, **2011**; 106 pp.

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7. Conn, P. J.; Lindsley, C. W.; Hopkins, C. R.; Niswender, C. M.; Gogliotti, R. D. *mGluR4 Allosteric Potentiators, Compositions, and Methods of Treating Neurological Dysfunction* PCT Int. Appl. 2011/050305, **2011**; 136 pp.

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5. Conn, P. J.; Lindsley, C. W.; Hopkins, C. R.; Weaver, C. D.; Niswender, C. M.; Cheung, Y.-Y. *Substituted benzimidazolesulfonamides and substituted indolesulfonamides as mGluR4 potentiators*. PCT Int. Appl. 2011/011722, **2011**; 131 pp.

4. Conn, P. J.; Lindsley, C. W.; Hopkins, C. R.; Weaver, C. D.; Niswender, C. M.; Gogliotti, R. D.; Engers, D. W. *Substituted 1,1,3,3-tetraoxidobenzo[d][1,3,2]dithiazoles as mGluR4 allosteric potentiators, compositions, and methods of treating neurological dysfunction*. PCT Int. Appl. WO2010/088406, **2010**; 162 pp.

3. Hong, C. C.; Hopkins, C. R.; Hatzopoulos, A. K.; Lindsley, C. W.; Hao, J. *Compounds and Methods Useful for Directing Stem Cell Differentiation*. US Pat. Appl. No. 12/537,037, **2009**; 65 pp.

2. Majid, T. N.; Hopkins, C. R.; Pedgrift, B. L.; Collar, N.; Wirtz-Brugger, F.; Merrill, J. *Pyrazoloisoquinoline derivatives as kinase inhibitors, and their preparation, pharmaceutical compositions, and use in the treatment of diseases involving increased NIK activity.* PCT Int. Appl. WO2005/012301, **2005**; 94 pp.

1. Hopkins, C. R. and Collar, N. *Synthetic Process of Making Substituted Azaindoles*, Serial No. 60/550,440; U. S. Patent Pending.

Invited Lectures

30. "Positive allosteric modulators of mGlu4 for the treatment of Parkinson's disease: From HTS to pre-clinical leads", Hopkins, C. R. Invited talk presented in the *GPCR-Based Drug Discovery: Signaling and Pharmacological Complexities* session at the 14th Discovery on Target: Boston, MA, September 22nd, 2016.

29. "Discovery and optimization of novel, small molecules as *in vivo* tool compounds and beyond", Hopkins, C. R. Invited talk at Purdue University, Department of Medicinal Chemistry and Molecular Pharmacology, West Lafayette, IN, March 10th, 2016.

28. "Discovery and Development of Small Molecules as Potential First-In-Class Therapeutics", Hopkins, C. R. Invited talk at Indiana University-Purdue University Indianapolis, Department of Chemistry & Chemical Biology, Indianapolis, IN, January 27th, 2016.

27. "Discovery and optimization of novel, small molecules as *in vivo* tool compounds and beyond", Hopkins, C. R. Invited talk at the University of Notre Dame, Department of Chemistry and Biochemistry and the Warren Center for Drug Discovery and Development, Notre Dame, IN, January 25th, 2016.

26. "Positive Allosteric Modulators of mGlu4 for the Treatment of Parkinson's Disease: From HTS to Pre-clinical Leads", Hopkins, C. R. Invited talk presented at Southern Research, Department of Drug Discovery, Birmingham, AL, January 15th, 2016.

25. "Discovery and optimization of novel, small molecules as *in vivo* tool compounds and beyond", Hopkins, C. R. Invited talk at the University of Florida, College of Pharmacy, Gainesville, FL, January 11 – 12th, 2016.

24. "Ion channel therapeutics: a medicinal chemist's perspective", Hopkins, C. R. Invited talk presented at 2nd Annual Glom-NExT Symposium, Center for Glomerular Kidney Disease and Novel Experimental Therapeutics, Harvard Medical School, Boston, MA, October 19th, 2015.

23. "Allosteric Modulators of GPCRs – Practical Approaches", Hopkins, C. R. Invited talk as part of Pre-Conference Short Course on *Allosteric Modulators of GPCRs (PAMs, NAMs)* at the *12th Annual Mastering Medicinal Chemistry*, Boston, MA, June 9th, 2015.

22. "Discovery and Development of Small Molecules as Potential First-In-Class Therapeutics", Hopkins, C. R. Invited talk at Michigan State University, Department of Pharmacology and Toxicology, East Lansing, MI, April 7 – 8th, 2015

21. "Positive Allosteric Modulators of mGlu4 for the Treatment of Parkinson's Disease: From HTS to Pre-clinical Leads", Hopkins, C. R. Invited talk presented at *GPCR Drug Discovery – Identification and Optimization of Positive Allosteric Modulators for Difficult Targets*, New York Academy of Sciences, New York, NY, March 24th, 2015.

20. "Discovery and Development of Small Molecules as Potential First-In-Class Therapeutics", Hopkins, C. R. Invited talk at Purdue University, Department of Medicinal Chemistry and Molecular Pharmacology, West Lafayette, IN, February 10 – 11th, 2015.

19. "Discovery and Development of Small Molecule, *In Vivo* Active Compounds as Potential First-in-Class Therapeutics", Hopkins, C. R. Invited talk at the National Institutes of Health, National Institute of Neurological Disorders and Stroke, Bethesda, MD, January 28th, 2015.

18. "Discovery and optimization of novel, small molecules as *in vivo* tool compounds and beyond", Hopkins, C. R. Invited talk at the University of Wisconsin-Madison, School of Pharmacy, Madison, WI, January 8 – 9th, 2015.

17. "Chemical considerations for hit triage: From hit-to-lead", Hopkins, C. R. Invited talk at Michigan State University, Drug Discovery Lecture Series, East Lansing, MI, October 31st, 2014.

16. "Multiple models for industrial-academic collaborations in CNS drug discovery", Hopkins, C. R. (Lindsley, C. W.). *Abstracts of Papers*, Oral Presentation at the 248th National Meeting of the American Chemical Society: San Francisco, CA: Paper ID: 319. August 2014.

15. "Novel $mGlu_4$ Positive Allosteric Modulators for the Treatment of Parkinson's Disease", Hopkins, C. R.* Invited talk presented in the *GPCR-Targeted Therapeutics: Progressing Drug Candidates* session at the 11th Discovery on Target: Boston, MA, September 25th, 2013.

14. "Preclinical validation of mGluR4 activation as a potentially groundbreaking treatment for Parkinson's disease", Hopkins, C. R.*, Invited talk presented in the *Mining the Metabotropic Glutamate Receptors Type 4 (mGluR4) and Their Ligands in Brain Disorders* session at the 25th European College of Neuropsychopharmacology: Vienna, Austria, October 16th, 2012, Session S.24.

13. "Vanderbilt Center for Neuroscience Drug Discovery: Translating Basic Science into Patient Care", Hopkins, C. R., Keynote Address at the Regenerative Medicine in Gluacoma Symposium: Nashville, TN, Sept. 20th, 2012.

12. "Insights into the SAR of modulators of GPCRs and Ion Channels: From Allosteric Modulation to Mode Switching", Hopkins, C. R., Invited talk at Givaudan Flavors Corp., Cincinnati, OH. September 4th, 2012.

11. "The Discovery and Development of Positive Allosteric Modulators of $mGlu_4$ for the Treatment of Parkinson's Disease", Hopkins, C. R.*, Invited talk presented in the 2nd Annual Targeting Parkinson's Disease Symposium at the 11th Annual World Pharma Congress: Drug Discovery Summit: Philadelphia, PA, June 4th, 2012.

10. "Discovery and optimization of novel, small molecule probes for central nervous disorders", Hopkins, C. R.* *Abstracts of Papers*, Invited talk presented in Chemical Neuroscience session at the 243rd National Meeting of the American Chemical Society: San Diego, CA: Abstract 379, March 2012.

9. "Discovery and Development of Positive Allosteric Modulators of $mGlu_4$ for the Treatment of Parkinson's Disease", Hopkins, C. R.*, Invited talk presented in the Targeting Parkinson's Disease Symposium at the 10th Annual World Pharma Congress: Drug Discovery Summit: Philadelphia, PA, June 9th, 2011.

8. "Utilizing a Technology Enabled Synthetic Approach to Discovery Novel *In Vivo* Tool Compounds as Potential Therapeutics for Parkinson's Disease", Hopkins, C. R.*, Invited talk presented in the Technology Enabled Organic Synthesis Symposium at the 42nd Meeting of the American Chemical Society Central Region: Indianapolis, IN, June 8th, 2011.

7. "Drug Discovery in an Academic Setting – it is possible!", Hopkins, C. R.*, Invited talk presented at the American Chemical Society Pharma Leaders Meeting: Abbott Laboratories, Abbott Park, IL, November 11–12, 2010.

6. "Discovery, Characterization, and Antiparkinsonian Effect of a Series of Heterobiarylamides as Positive Allosteric Modulators of Metabotropic Glutamate Receptor 4", Hopkins, C. R.*, Invited talk presented at the 32nd National Medicinal Chemistry Symposium: Minneapolis, MN, June 2010.

5. "The Development of Positive Allosteric Modulators of mGluR4 for the Treatment of Parkinson's Disease", Hopkins, C. R. Invited talk presented the Vanderbilt Institute of Chemical Biology: Nashville, TN, March 2010.

4. "Allosteric Modulators: An Overview and the Discovery and SAR of Positive Allosteric Moculators of mGluR4 as a Potentially Novel Therapeutic Direction for the Treatment of Parkinson's Disease", Hopkins, C. R., Invited talk presented at the ACS Prospectives: Tactical Approaches to the Challenge of Drug Failure: Philadelphia, PA, October 2009.

3. "Vanderbilt Program in Drug Discovery: Drug and Ligand Discovery in Academia", Hopkins, C. R., Invited talk presented at Center for Chemical Genomics Symposium, Screening and

Beyond: Assays, hits, probes, leads…drugs: University of Michigan, Ann Arbor, MI, May 2009.

2. "Discovery and SAR of Positive Allosteric Modulators of mGluR4 as a Potentially Novel Therapeutic Direction for the Treatment of Parkinson's Disease", Hopkins, C. R., *Abstracts of Papers*, Invited talk presented in the Latest Developments in Glutamate Receptors session at the 237th National Meeting of the American Chemical Society: Salt Lake City, UT: Abstract 139, March 2009.

1. "Discovery and SAR of Positive Allosteric Modulators of mGluR4 as a Potentially Novel Therapeutic Direction for the Treatment of Parkinson's Disease", Hopkins, C. R. Invited talk presented at Molecular Medicine Tri-Conference, Mastering Medicinal Chemistry, San Francisco, CA, February 2009.

Presentations

36. "Metabotropic glutamate receptor 7 as a therapeutic target for *MECP2*-related disorders", Niswender, C. M.*; Gogliotti, R. G.; Fisher, N. M.; Senter, R.; Gould, R. W.; Adams, J. J.; Stanley, B. J.; Walker, A. G.; Zamorano, R.; Blobaum, A. L.; Engers, D. W.; Hopkins, C. R.; Lindsley, C. W.; Jones, C. K.; Xiang, Z.; Conn, P. J. *Abstracts of Papers*, Poster presented at Society of Neuroscience 2016: San Diego, CA, November 2016.

35. "Metabotropic glutamate receptor 7 as a therapeutic target for *MECP2*-related disorders", Fisher, N. M.; Gogliotti, R. G.; Senter, R.; Gould, R. G.; Walker, A. G.; Zamorano, R.; Adams, J. J.; Blobaum, A. L.; Engers, D. W.; Hopkins, C. R.; Lindsley, C. W.; Xiang, Z.; Jones, C. K.; Conn, P. J.; Niswender, C. M. *Abstracts of Papers*, Poster presented at the Rett Syndrome Symposium 2016: Eaglewood Resort, IL, June 2016.

34. "Small molecule ALK inhibitors with improved selectivity and pharmacokinetics inhibit heterotopic ossification without toxicity in a mouse model of fibrodysplasia ossificans progressiva", Perrien, D. S.*; Hopkins, C. R.; Lindsley, C.; Frist, A.; Durai, H.; Fleming, N.; Booton, S. E.; Hong, C. C. *Abstracts of Papers*, Poster Presentation at the American Society for Bone and Mineral Research Annual Meeting: Atlanta, GA. September 2016.

33. "Kir4.1 (*KCNJ10*) inhibition with a newly developed antagonist induces diuresis in rats", Kharade, S. V.*; Kurata, H.; Hopkins, C. R.; Denton, J. S. *Abstracts of Papers*, Poster Presentation at Experimental Biology 2016: Abstract: 1272.3. San Diego, CA. April 2016.

32. "Discovery and characterization of the choline transporter inhibitor: *N*-((3-isopropylisoxazol-5-yl)methyl)-4-chloro-3-((1-methylpiperidin-4-yl)oxy)benazmide, VU6001221", Bertron, J.*; Tarr, C.; Hopkins, C. R.; Ennis, E.; Wright, J.; Locuson, C.; Blakely, R.; Lindsley, C. *Abstracts of Papers*, Poster Presentation at the 71st SWRM/67th SERMACS: Memphis, TN: Paper ID: 494. November 2015.

31. "$mGlu_7$ is critical for hippocampal plasticity and is a potential therapeutic target for the treatment of Rett Syndrome", Klar, R.*; Gogliotti, R. G.; Walker, A. G.; Zamorano, R.; Engers, D. W.; Ghose, D.; Grueter, B. A.; Hopkins, C. R.; Lindsley, C. W.; Xiang, Z.; Conn, P. J.; Niswender, C. M. *Abstracts of Papers*, Poster presented at Society of Neuroscience, 2015: Abstract ID: 120.14/A97. Chicago, IL, October 2015.

30. "Development of novel $mGlu_1$ PAMs: Chemical tools to improve functionality of mutant receptor isoforms found in a schizophrenic population", Garcia-Barrantes, P.*; Cho, H.; Brogan, J.; Niswender, C.; Hopkins, C.; Conn, J.; Lindsley, C. *Abstracts of Papers*, Poster Presentation at the 250th National Meeting of the American Chemical Society: Boston, MA: Paper ID: 78. August 2015.

29. "Development of novel and selective mGlu1 PAMs: chemical modulation to improve functionality of mutant receptor isoforms found in schizophrenics", Garcia-Barrantes, P. M.; Cho, H. P.; Brogan, J. T.; Hopkins, C. R.; Niswender, C. M.; Morrison, R. D.; Daniels, J. D.; Conn, P. J.; Lindsley, C. W. Poster presentation at the 66th Southeast Regional Meeting of the American Chemical Society: Nashville, TN. Abstract: SERMACS-51. October 2014.

28. "Development of novel mGlu1 PAMs as tools to improve functionality of mutant receptor isoforms found in a schizophrenic population", Garcia-Barrantes, P. M.; Cho, H. P.; Brogan, J. T.; Hopkins, C. R.; Niswender, C. M.; Morrison, R. D.; Daniels, J. S.; Conn, P. J.; Lindsley, C. W. Poster presentation at the 8th International Meeting on Metabotropic Glutamate Receptors, Sept. 28th – Oct. 3rd, 2014. Poster #18.

27. "Imaging the antiparkinsonian effects of the novel metabotropic glutamate receptor subtype 4 positive allosteric modulator ADX88178", Byun, N.; Huang, A.; Baheza, R. A.; Barry, R. L.; Lindsley, C. W.; Hopkins, C. R.; Niswender, C.; Jones, C. K.; Gore, J. C.; Conn, P. J. Poster presentation at the 8th International Meeting on Metabotropic Glutamate Receptors, Sept. 28th – Oct. 3rd, 2014. Poster #77.

26. "Discovery and characterization of ML204, a novel inhibitor of the TRPC4 and TRPC5 ion channels that has been shown to protect the kidney filter", Hopkins, C. R.*; Schaldecker, T.; Kim, S.; Tarabanis, C.; Tian, D.; Hakroush, S.; Castonguay, P.; Ahn, W.; Wallentin, H.; Heid, H.; Lindsley, C. W.; Salovich, J. M.; Riccio, A.; Buvall, L.; Weins, A.; Greka, A. *Abstracts of Papers*, Oral Presentation at the 248th National Meeting of the American Chemical Society: San Francisco, CA: Paper ID: 20. August 2014.

25. "Development of non-isatin M1 positive allosteric modulators", Panarese, J. D.*; Rook, J. M.; Poslusney, M. S.; Melancon, B. J.; Bridges, T. M.; Cho, H. P.; Dickerson, J.; Hopkins, C.; Wood, M. R.; Xiang, Z.; Morrison, R.; Stauffer, S. R.; Daniels, J. S.; Niswender, C.; Jones, C. K.; Conn, P. J.; Lindsley, C. W. *Abstracts of Papers*, Poster Presentation at the 248th National Meeting of the American Chemical Society: San Francisco, CA: Paper ID: 130. August 2014.

24. "Development of a potent and ALK2 selective bone morphogenetic protein receptor (BMP) inhibitor", Hopkins, C. R.*; Engers, D. W.; Frist, A. Y.; Lindsley, C. W.; Hong, C. H. *Abstracts of Papers*, Oral Presentation at the 246th National Meeting of the American Chemical Society: Indianapolis, IN: Paper ID: 219. September 2013.

23. "Discovery and structure-activity relationship of a novel choline transporter inhibitor (ML352)", Engers, D. W.*; Ennis, E. A.; Ruggiero, A. M.; Blakely, R. D.; Hopkins, C. R.*; Lindsley, C. W. *Abstracts of Papers*, Poster presented at the 246th National Meeting of the American Chemical Society: Indianapolis, IN: Paper ID: 284. September 2013 (*Selected for Sci-Mix)*.

22. "A screen with potential: high-throughput screening efforts to identify novel inhibitors and activators of the presynaptic choline transporter", Ennis, E. A.*; Ruggiero, A. M.; Wright, J.;

Hopkins, C. R.; Lindsley, C. A.; Blakely, R. D. *Abstracts of Papers*, Poster presented at Biomedical Transporters 2013: St. Moritz, Switzerland. August 2013.

21. "High-throughput screen for novel inhibitors and activators of the presynaptic choline transporter", Ennis, E. A.*; Ruggiero, A. M.; Wright, J.; Hopkins, C. R.; Lindsley, C. W.; Blakely, R. D. *Abstracts of Papers*, Poster presented at Regulation of Neurotransmitters, Society of Neuroscience, 2012: New Orleans, LA: Abstract 740.15, October 2012.

20. "Effects of metabotropic glutamate receptor activation on neuroinflammation", Dickerson, J. W.*; Nedelcovych, M. T.; Stauffer, S. R.; Hopkins, C. R.; Niswender, C. M.; Lindsley, C. W.; Jones, C. K.; Conn, P. J. *Abstracts of Papers*, Poster presented at Metabotropic Glutamate Receptors I, Society of Neuroscience, 2012: New Orleans, LA: Abstract 740.15, October 2012.

19. "Characterization of novel positive allosteric modulators of Group III metabotropic glutamate receptors utilizing *in vitro* studies", Field, J. R.*; Melancon, B. J.; Zamorano, R.; Engers, D. W.; Salovich, J. M.; Cheung, Y. Y.; Days, E. L.; Lewis, L. M.; Xiang, Z.; Weaver, C. D.; Jones, C. K.; Wood, M. R.; Hopkins, C. R.; Lindsley, C. W.; Conn, P. J.; Niswender, C. M. *Abstracts of Papers*, Poster presented at G-Protein Coupled Receptors: Molecular Mechanisms and Novel Functional Insights", Keystone Symposium 2012: Banff, Alberta, February 2012.

18. "Discovery of an inward rectifying potassium channel inhibitor with preference for Kir2.2, Kir3.X and Kir7.1", Raphemot, R.*; Lonergan, D.; Nguyen, T. T.; Utley, T. J.; Rogliotti, R.; Hopkins, C. R.; Lewis, L. M.; Lindsley, C. W.; Weaver, C. D.; Denton, J. S. *Abstract of Papers*, Poster presented at Experimental Biology 2012: San Diego, CA.

17. "Co-administration of an $mGlu_4$ positive allosteric modulator and the A_{2A} antagonist preladenant improves efficacy in preclinical models of Parkinson's disease", Dickerson, J. W.*; Thompson, A. D.; Jones, C. K.; Niswender, C. M.; Hopkins, C. R.; Lindsley, C. W.; Conn, P. J. *Abstracts of Papers*, Poster presented at Nanosymposium: 638. Parkinson's Disease: Neural Mechanisms, Society of Neuroscience, 2011: Washington, D. C.: Abstract 638.09, November 2011.

16. "$mGlu_4$ receptor positive allosteric modulator development for the treatment of CNS disorders", Niswender, C. M.*; Jones, C. K.; Hopkins, C. R.; Thompson, A. D.; Bubser, M.; Engers, D.; Gogliotti, R. D.; Blobaum, A. E.; Salovich, J. M.; Cheung, Y. Y.; Morrison, R. D.; Dawson, E. S.; Zamorano, R.; Brewer, K. A.; Daniels, J. S.; Lindsley, C. W.; Conn, P. J., Oral presentation at the 7th International Meeting on Metabotropic Glutamate Receptors, Oct. 2nd – 7th, 2011.

15. "Discovery and SAR Development of a Novel Series of *N*-4-(2,5-dioxopyrrolidin-1-yl)-phenylpicolinamides, including ML182, as Positive Allosteric Modulators of Metabotropic Glutamate Receptor 4: A Novel Approach for the Treatment of Parkinson's Disease", Engers, D. W.; Le, U. M.; Zhou, Y.; Thompson, A. D.; Jadhav, S.; Gogliotti, R. D.; Lindsley, S. R.; Bolinger, J. L.; Menon, U. N.; Zamorano, R.; Daniels, J. S.; Blobaum, A. L.; Jones, C. K.; Weaver, C. D.; Conn, P. J.; Lindsley, C. W.; Niswender, C. M.; Hopkins, C. R.*, Poster presentation at the 7th International Meeting on Metabotropic Glutamate Receptors, Oct. 2nd – 7th, 2011.

14. "Drug Metabolism and Disposition of a Novel *N*-4-(2,5-dioxopyrrolidin-1-yl)-phenylpicolinamide Series of Positive Allosteric Modulators of Metabotropic Glutamate

Receptor 4: Identification of ML182 as an Orally Efficacious mGluR4-PAM", Blobaum, A. L.; Morrison, R.; Jadhav, S.; Engers, D. W.; Lindsley, S. R.; Zhou, Y.; Gogliotti, R. D.; Jones, C. K.; Niswender, C. M.; Conn, P. J.; Lindsley, C. W.; Hopkins, C. R.*; Daniels, J. S., Poster presentation at the 7th International Meeting on Metabotropic Glutamate Receptors, Oct. 2nd – 7th, 2011.

13. "Shape-based virtual screens to identify novel group I and III mGlu receptor allosteric modulator chemotypes", Dawson, E. S.*; Smith, J. A.; Niswender, C. M.; Hopkins, C. R.; Gogliotti, R.; Stauffer, S.; Lindsley, C. W.; Conn, P. J., Poster presentation at the 7th International Meeting on Metabotropic Glutamate Receptors, Oct. 2nd – 7th, 2011.

12. "The Discovery and Development of Positive Allosteric Modulators of $mGlu_4$ for the Treatment of Parkinson's Disease", Hopkins, C. R.*, Oral presentation at the 23rd International Congress on Heterocyclic Chemistry: Presentation O55, Glasgow, Scotland, July 31st – August 4th, 2011.

11. "mGluR4 Positive Allosteric Modulator Development for the Treatment of CNS Disorders", Niswender, C. M.*; Hopkins, C. R.; Jones, C. K.; Engers, D.; Thompson, A. D.; Field, J. R.; Gogliotti, R. D.; Blobaum, A. E.; Jadhav, S.; Salovich, J. M.; Cheung, Y.-Y.; Morrison, R. D.; Mulder, M. J.; Bolinger, J.; Dawson, E. S.; Zamorano, R.; Vinson, P. N.; Bubser, M.; Brewer, K. A.; Daniels, J. S.; Lindsley, C. W.; Conn, P. J. *Abstracts of Papers*, Poster presented at Metabotropic Glutamate Receptors: Disease and Aging, Society of Neuroscience, 2010: San Diego, CA: Abstract 642.9/E33, November 2010.

10. "VU0364770, a potent and systemically active positive allosteric modulator of mGluR4, produces robust efficacy in preclinical models of Parkinson's Disease", Thompson, A. D.*; Jones, C. K.; Bubser, M.; Niswender, C. M.; Hopkins, C. R.; Engers, D.; Jadhav, S.; Lindsley, C. W.; Conn, P. J. *Abstracts of Papers*, Poster presented at Metabotropic Glutamate Receptors: Disease and Aging, Society of Neuroscience, 2010: San Diego, CA: Abstract 642.10/E34, November 2010.

9. "Synthesis and SAR of piperazinyl and homopiperazinyl analogs as positive allosteric modulators of mGluR4", Cheung, Y. Y.*; Hopkins, C. R.; Niswender, C.; Lindsley, C. W.; Conn, P. J. *Abstracts of Papers*, Poster presented at: 240th American Chemical Society National Meeting: Boston, MA: Abstract 368, August 2010.

8. "Discovery and SAR Development of a Series of *N*-(4-acetamido)- and 4-(2,5-dioxopyrrolidin-1-yl)phenylpicolinamides as Positive Allosteric Modulators of Metabotropic Glutamate Receptor 4: A Novel Approach for the Treatment of Parkinson's Disease", Engers, D. W.*, Le, U. M.; Zhou, Y.; Jones, C. K.; Thompson, A. D.; Jadhav, S.; Menon, U. N.; Zamorano, R.; Daniels, J. S.; Morrison, R.; Blobaum, A. L.; Weaver, C. D.; Conn, P. J.; Lindsley, C. W.; Niswender, C. M.; Hopkins, C. R. *Abstract of Posters*, Presented at: High Throughput Chemistry & Chemical Biology Gordon Conference, Les Diablerets, Switzerland, June 2010.

7. "Discovery and SAR Development of Positive Allosteric Modulators of Metabotropic Glutamate Receptor 4: A Novel Approach for the Treatment of Parkinson's Disease", Gogliotti, R. D.*; Hopkins, C. R.; Jones, C. K.; Thompson, A. D.; Engers, D.; Salovich, J. M.; Cheung, Y.-Y.; Williams, R.; Gentry P. R.; Zhou, Y.; Johnson, K.; Jadhav, S.; Menon, U. N.; Zamorano, R.; Lindsley, C. W.; Weaver, C. D.; Conn, P. J.; Niswender, C. M. *Abstract of Posters*, Poster presented at: French American Chemical Society: Obernai, France, June 2010.

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