Curriculum Vitae (7/2013)

Mark J. McBride
Professor
Department of Biological Sciences
University of Wisconsin-Milwaukee
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Education:

1976-1980	University of Rochester Rochester, N. Y. B. S. in Microbiology
1980-1987	University of Wisconsin Madison, Wisconsin Ph.D. in Bacteriology (advisor-Professor J. C. Ensign) Thesis Title: The Metabolism of Endogenous Trehalose by Spores of *Streptomyces griseus*.

Employment:

1987-1991	Postdoctoral Research Assistant (advisor-Professor D. R. Zusman) Dept. Molecular and Cell Biology University of California-Berkeley Berkeley, CA 94720
1992-1998	Assistant Professor Department of Biological Sciences University of Wisconsin-Milwaukee Milwaukee, WI 53201
1998-2003	Associate Professor Department of Biological Sciences University of Wisconsin-Milwaukee
2003-present	Professor Department of Biological Sciences University of Wisconsin-Milwaukee

Honors and awards:

Graduate School/UWM Foundation Research Award 1998
Shaw Scientist Award 1995
University of Wisconsin Graduate School Research Committee Award 1993
National Institutes of Health Postdoctoral Fellowship 1989
Graduate Fellowship (University of Wisconsin) 1984
National Research Service Award (NIH) 1981

Wisconsin Alumni Research Fellowship 1980
Phi Beta Kappa 1980
University of Rochester Scholarship 1976
New York State Regents Scholarship 1976

Extramural Grants:

1. 'Gliding Motility of *Lysobacter* and *Cytophaga*'. NIH-AREA, 1R15GM51010-01; 8/94-7/97; McBride sole PI. $106,060.
2. 'Genetic Studies of *Cytophaga johnsonae* gliding motility'. NSF, MCB-9418308; 6/95-5/98; McBride sole PI. $300,000.
3. Shaw Scientist Award; 8/95-12/01; McBride sole PI. $175,000.
4. 'Genetic Analysis of *Flavobacterium johnsoniae* (*Cytophaga johnsonae*) Gliding Motility.' NSF, MCB-9727825. 6/1/98- 5/31/02; McBride sole PI. $330,000.
5. 'Mechanism of *Flavobacterium johnsoniae* gliding motility'. NSF, MCB-01-30967; 6/02-5/07; McBride sole PI. $422,000.
6. '*Flavobacterium johnsoniae* gliding motility: Role of cell-surface components.' NSF, MCB-0641366. 4/1/2007-3/31/2011; McBride sole PI. $603,554.
7. 'Novel motility and protein secretion machinery of *Flavobacterium johnsoniae*.' NSF, MCB-1021721 1/1/2011-12/31/2013; McBride sole PI. $567,671.
8. 'Genetic analysis of virulence factors of the fish pathogen *Flavobacterium columnare*'. Sea Grant; 2012-2014. McBride and Hunnicutt PI's. $88,511 to McBride.

Teaching Experience and Interests:

I have taught the following courses at The University of Wisconsin-Milwaukee:
General Microbiology (4 credit; undergraduate)
General Survey of Microbiology (4 credit; undergraduate)
General Virology (3 credit; undergraduate/graduate)
Molecular Biology of Microorganisms (3 credit; undergraduate/graduate)
Microbial Physiology (4 credit; undergraduate/graduate)
Aquatic Microbiology (2 credit; undergraduate/graduate)
Principles of Molecular Biology (4 credit; graduate)
Foundations of Biological Sciences II (microbiology section)
I have also conducted graduate seminar courses on a variety of topics.

Research Interests

Most of the research in my lab is directed toward identifying the mechanism(s) of bacterial gliding motility. Gliding motility (the movement of cells over surfaces without the aid of flagella or other obvious organelles) is a common means of bacterial locomotion but the mechanisms responsible for cell movement are not completely understood. We developed genetic techniques to manipulate a number of different species of gliding bacteria. Most of our efforts are currently focused on *Flavobacterium johnsoniae*. We have cloned and analyzed 14 genes that are needed for *F. johnsoniae* cell movement. We have identified a number of the important pieces of the motility apparatus and are beginning to determine how these proteins interact to result in cell movement. As part of these studies we recently determined that part of the motility machinery is also a novel protein secretion system. In collaboration with the Joint Genome Institute we have

sequenced and analyzed the genomes of 2 gliding bacteria, *Cytophaga hutchinsonii* and *Flavobacterium johnsoniae*. In addition to solving a basic scientific mystery, our studies of bacterial gliding motility have practical value. Some gliding bacteria degrade recalcitrant chemicals in the environment, and others cause disease in plants, animals, or humans. Applied projects in my lab include studies of cellulose degradation by *Cytophaga hutchinsonii*, chitin and hemicellulose digestion by *Flavobacterium johnsoniae*, and development of genetic techniques to study virulence of the fish pathogens *Flavobacterium psychrophilum* and *Flavobacterium columnare*.

Offices held in professional organizations and service on editorial boards:

Officer of the ASM North Central Branch 1996-1997. (Duties included assistance in organizing the 1996 Regional Meeting for the North Central Branch of the American Society for Microbiology.)

Chair-Elect of Division I (General Microbiology) of the American Society for Microbiology 1997. (Duties include organization of poster and seminar sessions for the annual meeting of the American Society for Microbiology).

Chair of Division I (General Microbiology) of the American Society for Microbiology 1998. (Duties include organization of poster and seminar sessions for the annual meeting of the American Society for Microbiology).

Member of the Editorial Board of Archives of Microbiology- 2001-2004.

Councilor for Division I (General Microbiology) of the American Society for Microbiology 2008-2010.

Member of the Editorial Board of Journal of Bacteriology- 2007-2009, 2010-2012, 2013-2015

Publications (* indicates corresponding author):

1. Tisa, L, M McBride and JC Ensign*. 1983. Studies of growth and morphology of *Frankia* strains EAN1pec, EuI1c, CpI1 and ACN1AG. Can. J. Bot. 61: 2768-2773.
2. McBride, MJ 1985. The effect of trehalose content on *Streptomyces griseus* spores. pp 847-849 in G. Szabo, S. Biro, and M. Goodfellow (eds) Biological, Biochemical and Biomedical Aspects of Actinomycetes. Akademiai Kiado, Budapest.
3. Ensign, JC*, MJ McBride, LJ Stoxen, A Bertinuson, M Pomplun, and A Ho. 1985. The life cycle of *Streptomyces*: Germination and properties of spores and regulation of sporulation. pp 777-790 in G. Szabo, S. Biro, and M. Goodfellow (eds) Biological, Biochemical and Biomedical Aspects of Actinomycetes. Akademiai Kiado, Budapest.
4. McBride, MJ and JC Ensign*. 1987. Effects of intracellular trehalose content on *Streptomyces griseus* spores. J. Bacteriol. 169:4995-5001.
5. McBride, MJ and JC Ensign*. 1987. Metabolism of endogenous trehalose by *Streptomyces griseus* spores and by spores and cells of other Actinomycetes. J. Bacteriol. 169:5002-5007.
6. McBride, MJ and JC Ensign*. 1990. Regulation of trehalose metabolism by *Streptomyces griseus* spores. J. Bacteriol. 172: 3637-3643.
7. McBride, MJ and DR Zusman*. 1989. Trehalose accumulation in vegetative cells and spores of *Myxococcus xanthus*. J. Bacteriol. 171:6383-6386.
8. McBride, MJ, RA Weinberg and DR Zusman*. 1989. "Frizzy" aggregation genes of the gliding bacterium *Myxococcus xanthus* show sequence similarities to the chemotaxis genes of enteric bacteria. Proc. Natl. Acad. Sci. 86:424-428.

9. Zusman, DR*, MJ McBride, WR McCleary and KA O'Connor. 1990. Control of directed motility in *Myxococcus xanthus*. pp 199-218 in J. P. Armitage and J. M. Lackie (eds.) Biology of the Chemotactic Response. Society for General Microbiology Symposium Volume 46. Cambridge University Press.
10. McCleary, W, MJ McBride and DR Zusman*. 1990. Developmental sensory transduction in *Myxococcus xanthus* involves methylation and demethylation of FrzCD. J. Bacteriol. 172:4877-4887.
11. Zusman, DR* and MJ McBride. 1991. Sensory transduction in the gliding bacterium *Myxococcus xanthus*. Molecular Microbiol. 5:2323-2329.
12. McBride, MJ, T Kohler and DR Zusman*. 1992. Methylation of FrzCD, a methyl accepting taxis protein of *Myxococcus xanthus*, is correlated with factors affecting cell behavior. J. Bacteriol. 174:4246-4257.
13. McBride, MJ and DR Zusman*. 1993. FrzCD, a methyl accepting taxis protein from *Myxococcus xanthus*, shows modulated methylation during fruiting body formation. J. Bacteriol. 175:4936-4940.
14. McBride, MJ*, P Hartzell and DR Zusman. 1993. Motility and tactic behavior of *Myxococcus xanthus*. pp 285-305 in M. Dworkin & D. Kaiser, ed. 'Myxobacteria II', ASM, Washington, D. C.
15. O'Connor, KA, MJ McBride, M West, H Yu, L Trinh, K Yuan, T Lee, and DR Zusman*. 1996. Photolyase of *Myxococcus xanthus*, a gram negative eubacterium, is more similar to photolyases found in archaea and "higher" eukaryotes than to photolyases of other eubacteria. J. Biol. Chem. 271:6252-6259.
16. McBride, MJ and DR Zusman*. 1996. Behavioral analysis of gliding cells of *Myxococcus xanthus* in response to prey cells of *E. coli*. FEMS Microbiol. Lett. 137:227-231.
17. McBride, MJ* and MJ Kempf. 1996. Development of techniques for the genetic manipulation of the gliding bacterium *Cytophaga johnsonae*. J. Bacteriol. 178:583-590. http://jb.asm.org/cgi/content/abstract/178/3/583
18. Lin, DL and MJ McBride*. 1996. Development of techniques for the genetic manipulation of the gliding bacteria *Lysobacter enzymogenes* and *Lysobacter brunescens*. Can. J. Microbiol. 42:896-902.
19. McBride, MJ* and SA Baker. 1996. Development of techniques to genetically manipulate members of the genera *Cytophaga, Flavobacterium*, *Flexibacter and Sporocytophaga.* Appl. Environ. Microbiol. 62:3017-3022. http://aem.asm.org/cgi/reprint/62/8/3017
20. Agarwal, S, DW Hunnicutt, and MJ McBride*. 1997. Cloning and characterization of the *Flavobacterium johnsoniae* (*Cytophaga johnsonae*) gliding motility gene, *gldA*. Proc. Natl. Acad. Sci. 94:12139-12144. http://www.pnas.org/cgi/content/full/94/22/12139
21. Hunnicutt, DW and MJ McBride*. 2000. Cloning and characterization of the *Flavobacterium johnsoniae* gliding motility genes, *gldB* and *gldC.* J. Bacteriol. 182:911-918. http://jb.asm.org/cgi/content/full/182/4/911
22. Kempf, MJ and MJ McBride*. 2000. Transposon insertions in the *Flavobacterium johnsoniae ftsX* gene disrupt gliding motility and cell division. J. Bacteriol. 182:1671-1679.
23. McBride, MJ* 2000. Bacterial Gliding Motility: Mechanisms and Mysteries. ASM News. 66:203-210.
24. Hunnicutt, DW and MJ McBride*. 2001. Cloning and characterization of the *Flavobacterium johnsoniae* gliding motility genes, *gldD* and *gldE.* J. Bacteriol. 183:4167-4175. http://jb.asm.org/cgi/content/full/183/14/4167

25. McBride, MJ* 2001. Bacterial Gliding Motility: Multiple mechanisms for cell movement over surfaces. Annu. Rev. Microbiol. 55:49-75. http://micro.AnnualReviews.org/content/vol55/issue1/
26. Hunnicutt, DW, MJ Kempf, and MJ McBride*. 2002. Mutations in *Flavobacterium johnsoniae gldF* and *gldG* disrupt gliding motility and interfere with membrane localization of GldA. J. Bacteriol. 184:2370-2378. http://jb.asm.org/cgi/content/full/184/9/2370
27. Krumholz, GD, MS Chval, MJ McBride, and LS Tisa*. 2003. Germination and physiological properties of Frankia spores. Plant and Soil 254:57-67.
28. McBride, MJ*, TF Braun, and JL Brust. 2003. *Flavobacterium johnsoniae* GldH is a lipoprotein that is required for gliding motility and chitin utilization. J. Bacteriol. 185:6648-6657. http://jb.asm.org/cgi/content/full/185/22/6648
29. Alvarez, B, P Secades, MJ McBride, and JA Guijarro*. 2004. Development of genetic techniques for the psychrotrophic fish pathogen *Flavobacterium psychrophilum*. Appl. Environ. Microbiol. 70:581-587. http://aem.asm.org/cgi/content/full/70/1/581
30. McBride, MJ*, and TF Braun. 2004. GldI is a lipoprotein that is required for *Flavobacterium johnsoniae* gliding motility and chitin utilization. J. Bacteriol. 186:2295-2302. http://jb.asm.org/cgi/content/full/186/8/2295
31. McBride, MJ*. 2004. Cytophaga-Flavobacterium gliding motility. J. Mol. Microbiol. Biotechnol. 7:63-71.
32. Braun, TF and MJ McBride*. 2005. *Flavobacterium johnsoniae* GldJ is a lipoprotein that is required for gliding motility. J. Bacteriol. 187:2628-2637. http://jb.asm.org/cgi/content/full/187/8/2628
33. Braun, TF, MK Khubbar, DA Saffarini and MJ McBride*. 2005. *Flavobacterium johnsoniae* gliding motility genes identified by *mariner* mutagenesis. J. Bacteriol. 187:6943-6952. http://jb.asm.org/cgi/content/full/187/20/6943
34. Nelson, SS and MJ McBride*. 2006. Mutations in *Flavobacterium johnsoniae secDF* result in defects in gliding motility and chitin utilization. J. Bacteriol. 188:348-351. http://jb.asm.org/cgi/content/full/188/1/348
35. Alvarez, B, P Secades, M Prieto, MJ McBride, and JA Guijarro*. 2006. A mutation in *Flavobacterium psychrophilum tlpB* inhibits gliding motility and induces biofilm formation. Appl. Environ. Microbiol. 72:4044-4053. http://aem.asm.org/cgi/content/full/72/6/4044
36. Xie, G, DC Bruce, JF Challacombe, O Chertkov, JC Detter, P Gilna, CS Han, S Lucas, M Misra, GL Myers, P Richardson, R Tapia, N Thayer, LS Thompson, TS Brettin, B Henrissat, DB Wilson, and MJ McBride*. 2007. Genome sequence of the cellulolytic gliding bacterium *Cytophaga hutchinsonii.* Appl. Environ. Microbiol. 73: 3536-3546. http://aem.asm.org/cgi/content/full/73/11/3536
37. Liu, J, MJ McBride, S Subramaniam. 2007. Cryo tomographic analysis of *Flavobacterium johnsoniae*. Biophysical Journal. Supplement: S. 142A.
38. Nelson, SS, PP Glocka, S Agarwal, DP Grimm, and MJ McBride*. 2007. *Flavobacterium johnsoniae* SprA is a cell-surface protein involved in gliding motility. J. Bacteriol. 189:7145-7150. http://jb.asm.org/cgi/content/full/189/19/7145
39. Liu, J, MJ McBride*, and S Subramaniam*. 2007. Cell-surface filaments of the gliding bacterium *Flavobacterium johnsoniae* revealed by cryo-electron tomography. J. Bacteriol. 189:7503-7506. http://jb.asm.org/cgi/content/full/189/20/7503
40. Nelson, SS, S Bollampalli, and MJ McBride*. 2008. SprB is a cell-surface component of the *Flavobacterium johnsoniae* gliding motility machinery. J. Bacteriol. 190:2851-2857. http://jb.asm.org/cgi/content/full/190/8/2851

41. Jarrell, KF*, and MJ McBride. 2008. The surprisingly diverse ways that prokaryotes move. Nature Rev. Microbiol. 6:466-476. http://www.nature.com/nrmicro/journal/v6/n6/abs/nrmicro1900.html
42. McBride, MJ*, G Xie, EC Martens, A Lapidus, B Henrissat, RG Rhodes, E Goltsman, W Wang, J Xu, DW Hunnicutt, AM Staroscik, TR Hoover, YQ Cheng, and JL Stein. 2009. Novel features of the polysaccharide-digesting gliding bacterium *Flavobacterium johnsoniae* as revealed by genome sequence analysis. Appl. Environ. Microbiol. 75:6864-6875. http://aem.asm.org/content/75/21/6864.long
43. McBride, MJ*, RG Rhodes, S Pochiraju, S Bollampalli, A Shrivastava, K Sato, M Naito, H Yukitake, H Hirakawa, M Shoji, K Nakayama. 2009. Novel motility and protein secretion machinery of *Flavobacterium johnsoniae*. Proceedings of 'Flavobacterium 2009', September 21-23, 2009. Paris, France.
44. Hunnicutt, DW*, G Xie, A Lapidus, E Goltsman, W Wang, J Xu, B Henrissat, EC Martens, AM Staroscik, Y Yamada, RG Rhodes, TR Hoover, YQ Cheng, and MJ McBride. 2009. The complete genome sequence of *Flavobacterium johnsoniae*. Proceedings of 'Flavobacterium 2009', September 21-23, 2009. Paris, France.
45. Sato, K, M Naito, H Yukitake, H Hirakawa, M Shoji, MJ McBride, RG Rhodes, and K Nakayama*. 2010. A protein secretion system linked to bacteroidete gliding motility and pathogenesis. Proc. Natl. Acad. Sci. USA. 107:276-281. http://www.pnas.org/content/107/1/276.full
46. Rhodes, RG, MN Samarasam, A Shrivastava, JM van Baaren, S Pochiraju, S Bollampalli, and MJ McBride*. 2010. *Flavobacterium johnsoniae gldN* and *gldO* are partially redundant genes required for gliding motility and surface localization of SprB. J. Bacteriol. 192:1201-1211. http://jb.asm.org/content/192/5/1201.long
47. McBride, MJ*. 2010. Shining a light on an opportunistic pathogen. J. Bacteriol. 192:6325-6326.
48. Rhodes, RG, SS Nelson, S Pochiraju, and MJ McBride*. 2011. *Flavobacterium johnsoniae sprB* is part of an operon spanning the additional gliding motility genes *sprC*, *sprD*, and *sprF*. J. Bacteriol. 193:599-610. http://jb.asm.org/content/193/3/599.long
49. Rhodes, RG, HG Pucker, and MJ McBride*. 2011. Development and use of a gene deletion strategy for *Flavobacterium johnsoniae* to identify the redundant gliding motility genes *remF*, *remG*, *remH*, and *remI*. J. Bacteriol. 193:2418-2428. http://jb.asm.org/content/193/10/2418.long
50. Rhodes, RG, MN Samarasam, EJ van Groll, and MJ McBride*. 2011. Mutations in *Flavobacterium johnsoniae sprE* result in defects in gliding motility and protein secretion. J. Bacteriol. 193:5322-5327. http://jb.asm.org/content/193/19/5322.long
51. Shrivastava, A, RG Rhodes, S Pochiraju, D Nakane, and MJ McBride*. 2012. *Flavobacterium johnsoniae* RemA is a mobile cell-surface lectin involved in gliding. J. Bacteriol. 194:3678-3688. http://jb.asm.org/content/194/14/3678.long
52. McBride, MJ* and Y Zhu. 2013. Gliding motility and Por secretion system genes are widespread among members of the phylum *Bacteroidetes*. J. Bacteriol. 195:270-278. http://jb.asm.org/content/195/2/270.long
53. Nakane, D, K Sato, H Wada, MJ McBride, K Nakayama. 2013. Helical flow of surface protein required for bacterial locomotion. Biophysical Journal 104:639A.
54. Nakane, D, K Sato, H Wada, MJ McBride*, and K Nakayama*. 2013. Helical flow of surface protein required for bacterial locomotion. 2013. Proc. Natl. Acad. Sci. USA. 110:11145-11150. http://www.pnas.org/content/110/27/11145.long

55. Shrivastava, A, JJ Johnston, JM van Baaren, and MJ McBride*. 2013. *Flavobacterium johnsoniae* GldK, GldL, GldM, and SprA are required for secretion of the cell-surface gliding motility adhesins SprB and RemA. J. Bacteriol. 195:3201-3212. http://jb.asm.org/content/195/14/3201.long
56. McBride, MJ*. 2013. The family *Flavobacteriaceae*. In Press. *In* The Prokaryotes, 4th Ed.. Springer.
57. McBride, MJ*, W Liu, X Lu, Y Zhu, and W Zhang. In Press. The family *Cytophagaceae*. *In* The Prokaryotes, 4th Ed.. Springer.