
BIOGRAPHICAL SKETCH

NAME Mary Ellen Davey		POSITION TITLE Associate Professor	
eRA COMMONS USER NAME (credential, e.g., agency login) DAVEY_MARYELLEN			
EDUCATION/TRAINING (Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable.)			
INSTITUTION AND LOCATION	DEGREE (if applicable)	MM/YY	FIELD OF STUDY
University of Vermont, Burlington, VT	B.S.	09/78-05/82	Clinical Microbiology
Michigan State University, East Lansing, MI	Ph.D.	09/94-08/99	Microbiology

A. Personal Statement

The current model for periodontal disease development indicates that the pathogenic potential of *P. gingivalis* is not solely dependent on its ability to colonize and proliferate; its physiological state and its associations within the microbial consortium direct development of a pathogenic community. The over-arching hypothesis of this application is that *P. gingivalis* responds to certain perturbations (in particular the availability of key amino acids) and this results in a change in its physiological state; making *P. gingivalis* then capable of triggering dysbiosis. The central hypothesis is that the availability of arginine is a key signal that regulates colonization and expression of virulence determinants in *P. gingivalis*. Our studies have shown that arginine is a signal that directs attachment and expression of virulence determinants, yet how *P. gingivalis* senses arginine availability and the regulatory mechanisms that transmit and control the response have yet to be determined. Our current goals are to determine how *P. gingivalis* senses arginine levels, how it responds to changes in arginine availability, and how changes in arginine levels affect its pathogenicity and its ability to colonize, invade, and activate human epithelial cells and macrophages.

B. Positions and Honors.

1983 - 1984 Research Technician, Department of Microbiology, UMASS, Amherst.
 1984 - 1987 Research Associate, The University of Texas Health Science Center, San Antonio, TX.
 1987 - 1992 Research Associate, Department of Microbiology, Salk Institute Biotechnology/Industrial Assoc. Inc., La Jolla, CA.
 1992 - 1994 Senior Research Associate, Dept. of Microbiology, The Agouron Institute, La Jolla, CA.
 1994 - 1999 Graduate Research Asst., Dept. of Microbiology, Michigan State University, East Lansing, MI.
 1999 - 2002 Postdoctoral Res., Dept. of Microbiology and Immunology, Dartmouth Medical School, Hanover, NH.
 2002 - 2003 Senior Scientist II, Anti-Infectives Dept., Genome Therapeutics Corp., Waltham, MA.
 2003 - 2006 Staff Associate, The Forsyth Institute, Boston, MA.
 2004 - 2006 John W. Hein Fellow, The Forsyth Institute, Boston, MA.
 2004 - 2013 Research Fellow, Department of Oral Medicine Infection and immunity, Harvard School of Dental Medicine, Boston, MA.
 2006 - 2010 Assistant Member of the Staff, The Forsyth Institute, Boston, MA.
 2010 - 2013 Associate Member of the Staff, The Forsyth Institute, Cambridge, MA.
 2011 - 2013 Co-director T32 Training Program, The Forsyth Institute, Cambridge, MA
 2012 - 2013 Vice Chairman, Department of Molecular Genetics, The Forsyth Institute, Cambridge, MA.
 2013 – present Associate Professor, University of Florida, College of Dentistry, Department of Oral Biology

Honors and Awards:

1982 Certified, American Society of Clinical Pathologists (ASCP).
 1992 - Member, American Society for Microbiology.
 1994 - 1999 Graduate Research Fellow, NSF Center for Microbial Ecology, Michigan State University.
 1995 - 1999 Graduate Research Fellow, DOE Plant Research Laboratory, Michigan State University.
 1999 - Member, International Society for Microbial Ecology.

- 1999 - 2002 NIH Postdoctoral Training Fellowship in Molecular Pathogenesis, Dartmouth Medical School.
2001 Award for best poster at the 9th International Symposium on Microbial Ecology.
2004 -2006 John W. Hein Research Fellowship Award.
2007 - *Ad hoc* journal reviewer: Microbiology and Molecular Biology Reviews.
2007 - *Ad hoc* journal reviewer: Microbiology.
2007 - *Ad hoc* journal reviewer: Journal of Bacteriology.
2007 - *Ad hoc* journal reviewer: Journal of Clinical Microbiology.
2007 - *Ad hoc* grant reviewer: National Science Foundation.
2008 - 2011 Panelist, NSF: Symbiosis, Defense, and Self-recognition grant review panel.
2012 - *Ad hoc* grant reviewer: National Institute of Dental and Craniofacial Research.

Other Experience and Memberships:

- 1982 Certified, American Society of Clinical Pathologists (ASCP).
1992 - Member, American Society for Microbiology.
1994 - 1999 Graduate Research Fellow, NSF Center for Microbial Ecology, Michigan State University.
1995 - 1999 Graduate Research Fellow, DOE Plant Research Laboratory, Michigan State University.
1999 - Member, International Society for Microbial Ecology.
1999 - 2002 NIH Postdoctoral Training Fellowship in Molecular Pathogenesis, Dartmouth Medical School.

C. Selected Peer-reviewed Publications (in chronological order).

- Davey ME**, Wood WA, Key R, Nakamura K, Stahl DA. (1993) Isolation of three species of Geotoga and Petrogoga: Two new genera, representing a new lineage in the bacterial line of descent distantly related to the "Thermotogales" system. *Appl. Microbiol.* **16**:191-200.
- Zhou J, **Davey ME**, Figueras JB, Rivkina E, Gilichinsky D, Tiedje JM. (1997) Phylogenetic diversity of a bacterial community determined from Siberian tundra soil DNA. *Microbiology* **143**(Pt. 12):3913-3919.
- Davey ME**, Gevertz D, Clark JB, Wood WA, Jenneman GE. (1998) Microbial selective plugging of sandstone through stimulation of indigenous bacteria in a hypersaline oil reservoir. *Geomicrobiol. J.* **15**:335-352.
- Davey ME**, O'Toole GA. (2000) Microbial biofilms: From ecology to molecular genetics. *Microbiol. Mol. Biol. Rev.* **64**(4):847-867. PMID: PMC99016
- Davey ME**, de Bruijn FJ. (2000) A homologue of the tryptophan-rich sensory protein TspO and FixL regulate a novel nutrient deprivation-induced *Sinorhizobium meliloti* locus. *Appl. Environ. Microbiol.* **66**(12):5353-5359. PMID: PMC92468
- Davey ME**, Caiazza NC, O'Toole GA. (2003) Rhamnolipid surfactant production affects biofilm architecture in *Pseudomonas aeruginosa* PAO1. *J. Bacteriol.* **185**(3):1027-1036. PMID: PMC142794
- Davey ME**, Duncan MJ. (2006) Enhanced biofilm formation and loss of capsule synthesis: Deletion of a putative glycosyltransferase in *Porphyromonas gingivalis*. *J. Bacteriol.* **188**(15):5510-5523. PMID: PMC1540017
- Davey ME**, Costerton JW. (2006) Molecular genetics analyses of biofilm formation in oral pathogens. *Periodontol.* 2000 **42**(1):13-26.
- Davey ME**. (2006) Techniques for the growth of *Porphyromonas gingivalis* biofilms. *Periodontol.* 2000 **42**(1): 27-35.
- Davey ME**. (2008) Tracking the dynamic interactions during plaque formation[∇]. Guest Commentary. *J. Bacteriol.* **190**(24):7869-7870. PMID: PMC2593234
- Arndt A, **Davey ME**. (2009) *Porphyromonas gingivalis*: surface polysaccharides as virulence determinants. In: Sasano T, Suzuki O. (eds). 1st Tohoku-Forsyth Symposium, Boston, MA, March 10-11, 2009. *Interface Oral Health Science 2009*, pp. 382-387.
- Christopher AB, Arndt A, Cugini C, **Davey ME**. (2010) A streptococcal effector protein that inhibits *Porphyromonas gingivalis* biofilm development. *Microbiology* **156**(Pt.11):3469-3477.
- Alberti-Segui C, Arndt A, Cugini C, Priyadarshini R, **Davey ME**. (2010) HU protein: Transcription of surface polysaccharide synthesis genes in *Porphyromonas gingivalis*. *J. Bacteriol.* **192**(23):6217-6229. PMID: PMC2981211
- Priyadarshini R, Cugini C, Arndt A, Chen T, Tjokro NO, Goodman SD, **Davey ME** (2012) The nucleoid-associated protein HUbeta affects global gene expression in *Porphyromonas gingivalis*. *Microbiology*; 159:219 – 229.
- Cugini C, Stephens D N, Nguyen D., Kantarci A, **Davey ME**. (2012) Arginine deiminase inhibits *Porphyromonas gingivalis* surface attachment. *Microbiology*; 159:275 - 285.
- Cugini C, Klepac-Ceraj V, Rackaityte E, Riggs JE, **Davey ME**. (2013) *Porphyromonas gingivalis*: keeping the pathos out of the biont. *J. Oral Microbiol.* 5:19804. PMID: PMC3617648

D. Research Support.

Ongoing Research Support

5 R01-DE019117-04 Davey (PI)

05/01/09 - 03/31/14

NIH;NIDCR

Regulatory Mechanisms Controlling Expression of *P. gingivalis* Surface Structures

The Specific Aims being pursued are: 1) Determine the regulatory role of PG0121 in *P. gingivalis* capsule expression. 2) Identify HU-controlled genes involved in transcriptional regulation or polysaccharide synthesis. 3) Determine the regulation of transcription within the PG0104-PG0121 region.

Role: PI

1 F32-DE022484-01A1 Cugini (PI) (latest activation date)

08/01/12 - 07/31/15

NIH;NIDCR

Inhibition of *P. gingivalis* Biofilm Formation by a Streptococcal Effector Protein

The Specific Aims are: 1) Characterize the action of ADI on *P. gingivalis* biofilm development and protein localization. 2) Determine the mechanism by which *P. gingivalis* senses ADI.

Role: Sponsor