CURRICULUM VITAE

R. MEGANATHAN: Professor of Biological Sciences; Distinguished Research Professor.

DATE: January 2015

EDUCATION:

B. S., Agriculture, University of Madras, 1963
M. S., Microbiology, Oklahoma State University, 1968
Ph.D., Microbiology, Oklahoma State University, 1970

AREA (S) OF SPECIALIZATION:

Microbiology, Microbial Physiology, Biochemistry and Molecular Biology

PROFESSIONAL EXPERIENCE:

Distinguished Research Professor-2006-
Presidential Research Professor-2002 - 2006
Professor, Department of Biological Sciences, Northern Illinois University, 1991 - Present.
Visiting Professor, Department of Microbiology and Molecular Genetics, University of California, Los Angeles, California -Spring 1995.
Scientific Director (Acting), Plant Molecular Biology Center, Northern Illinois University, 1991-1992.
Associate Professor, Department of Biological Sciences, Northern Illinois University, 1985-1991
Assistant Professor, Department of Biological Sciences, Northern Illinois University, 1982-1985
Research Associate, Departments of Microbiology and Biological Sciences, University of Pittsburgh, Pittsburgh, Pennsylvania, 1976-1982
Research Associate, Department of Microbiology, University of Pennsylvania School of Medicine, 1974-1975
Postdoctoral Fellow, Department of Microbiology, University of Rochester School of Medicine and Dentistry, Rochester, New York, 1972-1973
Postdoctoral Fellow, Department of Bacteriology, University of Wisconsin, Madison, 1970-1972.

MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS:

American Society for Microbiology, American Association for the Advancement of Science, American Society for Biochemistry and Molecular Biology, Sigma XI

HONORS RECEIVED

Fellow- American Academy of Microbiology- Elected 1998.
Presidential Research Professor-2002-2006
Distinguished Research Professor-2006-Present

PROFESSIONAL RECOGNITION (Listed in the following)

American Men and Women of Science
Who is who in America?
Who is who in Science and Engineering?

MAJOR EXTERNALLY FUNDED GRANTS RECEIVED

Principal Investigator on NIH grant, "Sequence and regulation of vitamin K biosynthesis genes." National Institutes of Health 1989-1993, $100,000 + 48% indirect costs.

Principal Investigator on NIH grant, "Sequence and Regulation of Vitamin K Biosynthesis Genes." July 1994-July 1999, $555,800.00 + 48% indirect costs.

Principal Investigator on NIH grant, “Studies on Vitamin K Biosynthesis”.2002-2005 $144,000.

Co- Investigator on NIH grant Design and Study of IspF Inhibitors as Antibacterial Agents- $356,130.00

PUBLICATIONS

Book Chapters:

Meganathan, R., T. Folger and R. Bentley. 1979. Enzymes involved in vitamin K biosynthesis. p. 188-192. In J.W. Suttie (ed) Vitamin K Metabolism and Vitamin K-dependent Proteins. University Park Press, Baltimore.

Castric, P.A., K.F. Castric and **R. Meganathan**. 1981. Factors influencing the termination of cyanogenesis in *Pseudomonas aeruginosa*. p. 263-274. In B. Vennesland, E.E. Conn, C.J. Knowles, J. Westley, and F. Wissing (eds.) Cyanide in Biology. Academic Press, London.

Bentley, R. and **R. Meganathan**. 1987. The biosynthesis of isoprenoid quinones ubiquinone and menaquinone. In F.C. Neidhardt, J. Ingraham, K.B. Low, B. Magasanik, M. Schaechter, and H.W. Umbargar (eds.) *Escherichia coli* and *Salmonella typhinurium* cellular and molecular biology. p. 512-520. American Society for Microbiology, Washington, D.C.

Meganathan, R. 1996. Biosynthesis of the isoprenoid quinones menaquinone (vitamin K_2) and ubiquinone (coenzyme Q), p. 642-656. *In* F.C. Neidhardt, R. Curtiss III, J.L. Ingraham, E.C.C. Lin, K.B. Low, B. Magasanik, W.S. Reznikoff, M. Riley, M. Schaechter, and H. E. Umbarger (eds.), *Escherichia coli* and *Salmonella*: Cellular and molecular biology. American Society for Microbiology, Washington, D.C.

Meganathan, R. 2001. Biosynthesis of menaquinone (vitamin K_2) and ubiquinone (coenzyme Q): A perspective on enzymatic mechanisms. Vitamins and Hormones, 61:173-218. Academic Press, New York,

Meganathan. R., Y. Ranganathan and C. A. Reddy. 2007. Carbohydrate fermentations. Chapter 22. pp 558-585. *In* C. A. Reddy, T. J. Beveridge, J. A. Breznak, G. A. Marzluff, and T. M. Schmidt (ed.), Methods for General and Molecular Microbiology, American Society for Microbiology, Washington, D.C.

Meganathan, R. and O. Kwon. 2008. Biosynthesis of Menaquinone (Vitamin K_2) and Ubiquinone (Coenzyme Q). January 2009, posting date. Chapter 3.6.3.3, Biosynthesis of Menaquinone (Vitamin K_2) and Ubiquinone (Coenzyme Q). In A. Böck, R. Curtiss III, J. B. Kaper, P. D. Karp, F. C. Neidhardt, T. Nyström, J. M. Slauch, C. L. Squires, and D. Ussery (ed.), EcoSal-*Escherichia coli* and *Salmonella:* cellular and molecular biology**. http://www.ecosal.org**. American Society for Microbiology Press, Washington, DC.

Ranganathan, Y., S. Patel*.,V. K. Pasupuleti and **R. Meganathan**. 2010. Protein hydrolysates from non-bovine and plant sources replaces tryptone in microbiological media. Chapter 7, pp 115-125. In V.K. Pasupuleti and A.L. Demain, (Eds.), Protein hydrolysates in biotechnology, Springer. http://www.springerlink.com/content/g302323827512t43/

Meganathan, R. 2010. Menaquinone/Ubiquinone Biosynthesis and Enzymology. *In* Comprehensive Natural Products II: Chemistry and Biology, Editors-In-Chief Lewis Mander and Hung-Wen Liu; Volume **7**. Pp. 411-444. **"Cofactors"** Edited by Tadhg Begley. Elsevier Science. http://www.elsevierdirect.com/ISBN/9780080453811/Comprehensive-Natural-Products-II-Chemistry-and-Biology

Meganathan, R. and O. Kwon.2014. Biosynthesis of Menaquinone (Vitamin K_2) and Ubiquinone (Coenzyme Q). **NIH Public Access** Ecosal Plus. Author manuscript; available in PMC 2014 **September 23**.

Review Articles:

Bentley, R., and **R. Meganathan**. 1982. Biosynthesis of vitamin K (Menaquinone) in bacteria. Microbiol. Reviews 46:241-280.

Bentley, R., and **R. Meganathan**. 1983. Vitamin-K biosynthesis in bacteria-precursors, intermediates, enzymes and genes. J. Natural Prod. 46:44-59.

Meganathan, R. 2001. Ubiquinone biosynthesis in microorganisms. FEMS Microbiol. [MiniReview] . 203:131-139

Journal Articles:

Meganathan, R. and R.E. Marquis. 1973. Loss of bacterial motility under pressure. Nature (London) 246:525-527.

Holtzer, H., J. Biehl, G. Yeoh, **R. Meganathan** and A. Kaji. 1975. Effect of oncogenic virus on muscle differentiation. Proc. Nat. Acad. Sci. USA, 72:4051-4055.

Meganathan, R. and J.C. Ensign. 1976. Stability of enzymes in starving *Arthrobacter crystallopoietes*. J. Gen. Microbiol. 94:90-96.

Meganathan, R. and P.A. Castric. 1977. The effect of inorganic phosphate on cyanogenesis by *Pseudomonas aeruginosa*. Arch. Microbiol. 114:51-54.

Prihar, H.S., **R. Meganathan**, and D.S. Feingold. 1978. Loss of C-5 hydrogen during conversion of D-glucuronic acid to methyl-α-D-glucopyronoside. Carbohydr. Res. 67:271-274.

Meganathan, R. 1979. Why has the "nitrogenase plasmid" snubbed the Pseudomonads? J. Theoretical Biol. 80:301-304.

Meganathan, R. and R. Bentley. 1979. Menaquinone (vitamin K_2) biosynthesis: Conversion of *o*-succinylbenzoic acid to 1,4-dihydroxy-2-naphthoic acid by *Mycobacterium phlei* enzymes. J. Bacteriol. 140:92-98.

Meganathan, R., T. Folger and R. Bentley. 1980. Conversion of *o*-succinylbenzoate to dihydroxynaphthoate by extracts of *Micrococcus luteus*. Biochemistry 19:785-789.

Meganathan, R., R. Bentley and H. Taber. 1981. Identification of *Bacillus subtilis men* mutants which lack *o*-succinylbenzoyl-Coenzyme A synthetase and dihydroxynaphthoate synthase. J. Bacteriol. 145:328-332.

Bentley, R. and **R. Meganathan**. 1981. Biosynthesis of geosmin and methylisoborneol in Streptomycetes. Evidence for an isoprenoid pathway and its absence in non-differentiating isolates. FEBS Letters 125:220-222.

Meganathan, R. and R. Bentley. 1981. Biosynthesis of *o*-succinylbenzoic acid in a *men*$^-$ *Escherichia coli* mutant requires decarboxylation of L-glutamate at the C-1 position. Biochemistry 20:5336-5340.

Meganathan, R. 1981. Enzymes from *Escherichia coli* synthesize *o*-succinylbenzoic acid, an intermediate in menaquinone (Vitamin K_2) biosynthesis. J. Biol. Chem. 256:9386-9388.

Shaw, D.J., J.R. Guest, **R. Meganathan** and R. Bentley. 1982. Characterization of *Escherichia coli men* mutants defective in conversion of *o*-succinylbenzoic acid to 1,4-dihydroxy-2-naphthoate. J. Bacteriol. 152:1132-1137.

Meganathan, R., and R. Bentley. 1983. Thiamine pyrophosphate requirement for *o*-succinylbenzoic acid synthesis in *Escherichia coli* and evidence for an intermediate. J. Bacteriol. 153:739-746.

Shaw, D.J, E.C. Robinson, **R. Meganathan**, R. Bentley and J.R. Guest. 1983. Recombinant plasmids containing menaquinone biosynthetic genes of Escherichia coli. FEMS Microbiol. Lett. 17:63-67.

Meganathan, R. 1984. Inability of *men* mutants of *Escherichia coli* to use trimethylamine-N-oxide as an electron acceptor. FEMS Microbiol. Lett. 24:57-62.

Meganathan, R. and R. Coffell. 1985. Identity of the quinone in *Bacillus alcalophilus*. J. Bacteriol. 164:911-913.

Marley, M.G., **R. Meganathan** and R. Bentley. 1986. Menaquinone (vitamin K_2) biosynthesis in *Escherichia coli*: Synthesis of *o*-succinylbenzoate does not require the decarboxylase activity of the Ketoglutanate dehydrogenase complex. Biochemistry 25:1304-1307.

Schrementi, J. and **R. Meganathan**. 1987. A gas chromatographic method for the determination of tetrahydrothiophene produced by enzymatic reduction of tetrahydrothiophene-1-oxide. Microbios Lett. 35:79-85.

Meganathan, R. and J. Schrementi. 1987. Tetrahydrothiophene 1-oxide as an electron acceptor for *Escherichia coli*. J. Bacteriol. 169:2862-2865.

Meganathan, R. and L. Miguel. 1987. Dimethyl sulphoxide respiration in *Proteus mirabilis*. Microbios 51:191-201.

Coffell, R., M.E.S. Hudspeth and **R. Meganathan**. 1990. Biochemical evidence for the exclusion of *Zoophagus insidians* from the Oomycetes. Mycologia 82:326-331.

Miguel, L. and **R. Meganathan**. 1991. Electron donors and the quinone involved in dimethyl sulfoxide reduction in *Escherichia coli*. Curr. Microbiol 22:109-115.

Zinnen, T.M., C.M. Heinkel, M.E.S. Hudspeth and **R. Meganathan**. 1991. Cytoplasmic mycolamanaran inhibits initial viral infection of certain *Nicotiana* species. Phytopathology 81:426-428.

Daruwala, R., and **R. Meganathan**. 1991. Dimethyl sulfoxide reductase is not required for trimethylamine N-oxide reduction in *Escherichia coli*. FEMS Microbiol. Lett. 83:255-260.

Valentine-Serano, A., M.E.S. Hudspeth and **R. Meganathan**. 1991. Reduction of N-oxides and sulfoxide by the same terminal reductase in *Proteus mirabilis*. Curr. Microbiol. 23:271-276.

Heinkel, C.M., M.E.S. Hudspeth, **R. Meganathan** and T.M. Zinnen. 1992. Further characterization of mycolamanaran-induced resistance: Temperature sensitivity against tobacco mosaic virus, and function against cauliflower mosaic virus and tomato spotted wilt virus. Phytopathology 82:637-641.

Sharma, V., R. Suvarna, **R. Meganathan**, and M.E.S. Hudspeth. 1992. Menaquinone (Vitamin K_2) biosynthesis: Nucleotide sequence and expression of the *menB* gene from *Escherichia coli*. J. Bacteriol. 174:5057-5062.

Palaniappan, C., V. Sharma, M.E.S. Hudspeth and **R. Meganathan**. 1992. Menaquinone (Vitamin K_2) biosynthesis: Evidence that the *Escherichia coli menD* gene encodes both 2-succinyl-6-hydroxy-2,4-cyclohexadiene-1-carboxylic acid synthase and 2-ketoglutarate decarboxylase activities. J. Bacteriol. 174:8111-8118.

Sharma, V., **R. Meganathan**, and M.E.S. Hudspeth. 1993. Menaquinone (vitamin K_2) biosynthesis: Cloning, nucleotide sequence and expression of *menC* gene from *Escherichia coli*. J. Bacteriol. 175:4917-4921.

Palaniappan, C., H. Taber and **R. Meganathan**. 1994. Biosynthesis of o-succinylbenzoic acid in *Bacillus subtilis*: Identification of *menD* mutants and evidence against the involvement of the 2-ketoglutarate dehydrogenase complex. J. Bacteriol. 176:2648-2653.

Sharma, V., M.E.S. Hudspeth, and **R. Meganathan**. 1996. Menaquinone (vitamin K_2) biosynthesis: Localization and characterization of the *menE* gene from *Escherichia coli*. Gene 168:43-48.

Kwon, O., M.E.S. Hudspeth and **R. Meganathan**. 1996. Anaerobic biosynthesis of enterobactin in *Escherichia coli*: Regulation of *entC* gene expression and evidence against its involvement in menaquinone (Vitamin K_2) biosynthesis. J. Bacteriol. 178:3252-3259.

Kwon, O., D.K. Bhattacharyya and **R. Meganathan**. 1996. Menaquinone (vitamin K_2) biosynthesis: Overexpression, purification, and characterization of *o*-succinylbenzoyl-CoA synthetase from *Escherichia coli*. J. Bacteriol. 178:6778-6781.

Daruwala, R., O. Kwon, **R. Meganathan** and M.E.S. Hudspeth. 1996. A new isochorismate synthase specifically involved in menaquinone (vitamin K_2) biosynthesis encoded by the *menF* gene. FEMS Microbiology Lett. 140:159-164.

Daruwala, R., D.K. Bhattacharyya, O. Kwon and **R. Meganathan**. 1997. Menaquinone (vitamin K_2) biosynthesis: overexpression, purification and characterization of a new Isochorismate synthase from *Escherichia coli*. J. Bacteriol. 179:3133-3138.

Bhattacharyya, D.K., O. Kwon and **R. Meganathan**. 1997. Vitamin K_2 (menaquinone) biosynthesis in *Escherichia coli*: Evidence for the presence of an essential histidine residue in *o*-succinylbenzoyl coenzyme A synthetase. J. Bacteriol. 179:6061-6065.

Suvarna, K., D. Stevenson, **R. Meganathan**, and M.E.S. Hudspeth. 1998. Menaquinone (vitamin K_2) biosynthesis: Localization and characterization of the *menA* gene from *Escherichia coli*. J. Bacteriol. 180:2782-2787.

Palmer, D.R.J., J.B. Garrett, V. Sharma, **R. Meganathan**, P.C. Babbitt, and J.A. Gerlt. 1999. Unexpected divergence of function and sequence: "N-acylamino acid racemase" is *o*-succinylbenzoate synthase. Biochemistry 38:4252-4258.

Kwon, O., A. Kotsakis, and **R. Meganathan**. 2000. Ubiquinone (Coenzyme Q) biosynthesis in *Escherichia coli*: localization, isolation, and identification of ubiF gene. FEMS Microbiol. Lett. 186:157-161.

Thompson, T., J. B. Garrett, E. A. Taylor, **R. Meganathan**, J. A. Gerlt, and I. Rayment. 2000. Evolution of enzymatic activity in the enolase superfamily: Structure of *o*-succinylbenzoate synthase from *Escherichia coli* in complex with Mg^{2+} and *o*-succinylbenzoate. Biochemistry 39:10662-10676.

Lee, K., X. Zhan, J. Gao, J. Qiu, Y. Feng, **R. Meganathan**, S. N. Cohen, and G Georgiou. 2003. RraA: a protein inhibitor of RNase E activity that globally modulates RNA abundance in *E. coli*. Cell 114:623-634.

Kwon, O., M. Druce-Hoffman, and **R. Meganathan**. 2005. Regulation of the ubiquinone (Coenzyme Q) biosynthetic genes *ubiCA* in *Escherichia coli*. Curr. Microbiol. 50:180-189.

Vos, M.,G. Esposito, J. N. Edirisinghe, S. Vilain, D. M. Haddad, J. R. Slabbaert, S. Van Meensel, O. Schaap, B. De Strooper, **R. Meganathan**, V. A. Morais, and P. Verstreken. 2012. Vitamin K_2 Is a Mitochondrial Electron Carrier That Rescues Pink1 Deficiency .Science. 336: 1306-1310. **Supplementary Materials**-**22 pages** of PDF-Containing **Materials and Methods, Figs**. **S1 to S11.**.

Abstracts:

Meganathan, R. and J.C. Ensign. 1972. Stability of enzymes in starving *Arthrobacter crystallopoietes*. Abstracts of the annual meeting of the American Society for Microbiology, page 45.

Meganathan, R. and P.A. Castric. 1976. Effect of phosphate on hydrogen cyanide biosynthesis in *Pseudonomas aeruginosa*. Abstracts of the annual meeting of the American Society for Microbiology, page 141.

Meganathan, R. and R. Bentley. 1979. Vitamin K (menaquinone) biosynthesis in *Mycobacterium phlei*: The conversion of *o*-succinylbenzoic acid to 1,4-dihydroxy-2-naphtholic acid requires two enzymes. Fed. Proc. 38:315.

Meganathan, R., T. Folger and R. Bentley. 1979. Formation of the spirodilactone of *o*-succinylbenzoic acid in *Micrococcus luteus* extracts: Clarification of its relationship to dihydroxynaphthoic acid and

menaquinone (vitamin K) biosynthesis. Abstracts of the XIth International Congress of Biochemistry. Toronto, Canada, page 713.

Bentley, R. and R. Meganathan. 1980. Studies of geosmin formation by Streptomycetes. Abstracts of the 12th Central Regional American Chemical Society Meeting, Abstract 179.

Meganathan, R., R. Bentley and H. Taber. 1980. Menaquinone (vitamin K_2) biosynthesis: Mutants of *Bacillus subtilis* blocked in the conversion of o-succinylbenzoic acid to 1,4-dihydroxynaphthoic acid. Abstracts of the 12th Central Regional American Chemical Society meeting. Abstract 144.

Meganathan, R. and R. Bentley. 1981. Geosmin and 2-methylisoborneol are isoprenoid metabolites, which are not produced by non-differentiating isolates of Streptomycetes. Abstracts of the annual meeting of the American Society for Microbiology, page 157.

Meganathan, R. and R. Bentley. 1982. Menaquinone (vitamin K) biosynthesis: evidence for a new intermediate between chorismate and *o*-succinylbenzoate. Abstracts of the annual meeting of the American Society for Microbiology, page 159.

Meganathan, R. and R. Coffell. 1984. Effect of pH and temperature on the differentiation of *Streptomyces sulfureus*. Abstracts of the annual meeting of the American Society for Microbiology, page 198.

Meganathan, R. and R. Coffell. 1985. Identify of the quinone in *Bacillus alcalophilus*. Abstracts of the annual meeting of the American Society for Microbiology, page 190.

Sanchez, B. and R. Meganathan, R. 1985. Properties of *menB* mutants of *Escherichia coli*. Abstracts of the annual meeting of the American Society for Microbiology, page 203.

Miguel, L. and R. Meganathan. 1986. Requirements for dimethylsulfoxide respiration in *Proteus mirabilis*. Abstracts of the annual meeting of the American Society for Microbiology, page 197.

Schrementi, J. and R. Meganathan. 1986. Tetrahydrothiophene 1-oxide as an electron acceptor for anaerobic growth of bacteria. Abstracts of the annual meeting of the American Society for Microbiology, page 214.

Miguel, L. and R. Meganathan. 1987. Requirements for dimethylsulfoxide reduction in *Escherichia coli*. Abstracts of the annual meeting of the American Society for Microbiology, page 222.

Diaz, C. and R. Meganathan. 1987. Nicotinamide-N-oxide as an electron acceptor for anaerobic growth of *Escherichia coli*. Abstracts of the annual meeting of the American Society for Microbiology, page 223.

Valentine, A., M. Hudspeth and R. Meganathan. 1988. Inability of *Proteus mirabilis* mutants to reduce N-oxides and sulfoxides. Abstracts of the annual meeting of the American Society for Microbiology, page 233.

Coffell, R., M.E.S. Hudspeth and R. Meganathan. 1989. Presence of glycogen in the rotifer trapping fungus *Zoophagus insidians*. Abstracts of the annual meeting of the American Society for Microbiology, page 260.

Sharma, V., K. Suvarna, R. Meganathan and M.E.S. Hudspeth. 1990. Menaquinone (Vitamin K_2) biosynthesis: Cloning and sequencing of the *menB* region from *Escherichia coli*. Abstracts of the annual meeting of the American Society for Microbiology, page 239.

Palaniappan, C. and R. Meganathan. 1990. Menaquinone (Vitamin K_2) biosynthesis: evidence that the *menD* gene codes for the 2-ketoglutarate decarboxylase activity. Abstracts of the annual meeting of the American Society for Microbiology, page 239.

Zinnen, T.M., C. Heinkel, M.E.S. Hudspeth and R. Meganathan. 1990. Mycolamanaran blocks initial viral infection in *Nicotiana tabacum*. Abstracts of the VIIIth International Congress of Virology. Berlin, Germany, page 463.

Palaniappan, C., V. Sharma, M.E.S. Hudspeth and R. Meganathan. 1991. Menaquinone (vitamin K_2) biosynthesis: Identification and nucleotide sequence of a new gene *menF*. Abstracts of the general meeting of the American Society for Microbiology, page 222.

Sharma, V., R. Meganathan and M.E.S. Hudspeth. 1991. Menaquinone (vitamin K_2) biosynthesis: Cloning and sequencing of the *menC* region from *Escherichia coli*. Abstracts of the general meeting of the American Society for Microbiology, page 222.

Sharma, V., M.E.S. Hudspeth and R. Meganathan. 1992. Menaquinone (vitamin K_2) biosynthesis: Cloning and sequencing of the *menE* gene of *Escherichia coli*. Abstracts of the annual meeting of the American Society for Microbiology, page 285.

Sharma, V., C. Palaniappan, M.E.S. Hudspeth and R. Meganathan. 1992. Menaquinone (vitamin K_2) biosynthesis: 2-ketoglutarate decarboxylase and SHCHC synthase are encoded by the same gene in *Escherichia coli*. Abstracts of the First International *E. coli* Genome meeting. Madison, WI, page 27.

Kwon, O., M.E.S. Hudspeth and R. Meganathan. 1993. Anaerobic regulation of *entC* gene expression by iron and evidence against its involvement in Vitamin-K biosynthesis. Abstracts of the annual meeting of the American Society for Microbiology, page 272.

Sharma, V., K. Suvarna, M.E.S. Hudspeth and R. Meganathan. 1993. Physical localization and nucleotide sequence of the *Escherichia coli* menaquinone (vitamin K_2) biosynthetic genes. Abstracts of the Second International *E. coli* Genome meeting. Madison, WI, page 10.

Daruwala, R., O. Kwon, M.E.S. Hudspeth and R. Meganathan. 1994. Menaquinone (vitamin K_2) biosynthesis: Evidence for a new gene encoding an alternate isochorismate synthase. Abstracts of the general meeting of the American Society for Microbiology, page 303.

Suvarna, K., R. Meganathan and M.E.S. Hudspeth. 1994. Menaquinone (vitamin K_2) biosynthesis: Cloning and nucleotide sequence of the *menA* gene from *Escherichia coli*. Abstracts of the general meeting of the American Society for Microbiology, page 303.

Daruwala, R., R. Meganathan and M.E.S. Hudspeth. 1996. Menaquinone (vitamin K_2) biosynthesis: Cloning and sequencing of the new gene *menF*, encoding a novel alternate isochorismate synthase in *Escherichia coli*. Abstracts of the general meeting of the American Society for American Society for Microbiology, page 562.

McHugh, H., K. Suvarna, M.E.S. Hudspeth and R. Meganathan. 1996. Menaquinone (vitamin K_2) biosynthesis in *Escherichia coli*: Identification of a new gene (*menG*). Abstracts of the general meeting of the American Society for American Society for Microbiology, page 559.

Stevenson, D.M., R. Meganathan and M.E.S. Hudspeth. 1996. Menaquinone (vitamin K_2) biosynthesis in *Escherichia coli*: Analysis of aerobic and anaerobic transcription of the *menB* gene. Abstracts of the general meeting of the American Society for American Society for Microbiology, page 559.

Bhattacharyya, D.K., O. Kwon and R. Meganathan. 1997. Identification of an essential histidine residue (His 341) in the vitamin K_2 biosynthetic enzyme OSB-CoA synthetase from *Escherichia coli* . Abstracts of the general meeting of the American Society for Microbiology, page 351.

Bhattacharyya, D.K., O. Kwon, R. Daruwala and R. Meganathan. 1997. Antagonistic binding of substrates to the vitamin K_2 biosynthetic enzyme OSB-CoA synthetase, monitored by the fluorescent ATP analog TNP-ATP. Abstracts of the general meeting of the American Society for Microbiology, page 352.

Stevenson, D.M., R. Meganathan and M.E.S. Hudspeth. 1997. Anaerobic transcription of a vitamin K_2 (menaquinone) biosynthetic gene cluster. Abstracts of the general meeting of the American Society for Microbiology, page 356.

Kwon, O., D.K. Bhattacharyya, C. Palaniappan and R. Meganathan. 1997. Menaquinone (vitamin K_2) biosynthesis: Overexpression, purification and properties of the bifunctional enzyme encoded by the *menD* gene. Abstracts of the general meeting of the American Society for Microbiology, page 356.

Druce-Hoffman, M., O. Kwon and R. Meganathan. 1997. Regulation of Coenzyme Q (Ubiquinone) biosynthetic genes *ubiC* and *ubiA* in *Escherichia coli*. Abstracts of the general meeting of the American Society for Microbiology, page 357.

Kwon, O., D.K. Bhattacharyya, C. Palaniappan and R. Meganathan. 1997. Menaquinone (vitamin K_2) biosynthesis: Overexpression, purification and properties of the bifunctional enzyme encoded by the *menD* gene. Abstractes of the general meeting of the American Society for Microbiology, page 356.

Druce-Hoffman, M., O. Kwon and R. Meganathan. 1997. Regulation of Coenzyme Q (Ubiquinone) biosynthetic genes *ubiC* and *ubiA* in *Escherichia coli*. Abstracts of the general meeting of the American Society for Microbiology, page 576.

Kwon, O., A. Kotsakis and R. Meganathan. 1998. Ubiquinone (Coenzyme Q) biosynthesis in *Escherichia coli*: Isolation and identification of *ubiF* gene. Abstracts of the General Meeting of the American Society for Microbiology, page 347.

Park, S., K. Ravi, E.S. Yergul, and R. Meganathan. 1999. Menaquinone (vitamin K_2) biosynthesis: Overexpression, characterization and identification of essential lysine residues in *o*-succinylbenzoate synthase. Abstracts of the general meeting of the American Society for American Society for Microbiology, page 423.

Meganathan, R. 2001. Menaquinone and ubiquinone biosynthesis, Symposium on vitamins and cofactors. Abstracts of the 222nd American Chemical Society National Meeting, paper#155.

Royan, S. V., M. Duvall, and R. Meganathan. 2002. Phylogeny of enolase superfamily of enzymes, enolase and *o*-succinylbenzoate synthase. Abstracts of the general meeting of the American Society for American Society for Microbiology.

Ranganathan, Y. S. Patel, A.J. More, R. Meganathan,V.K. Pasupuleti. 2004. Replacement of tryptone in fermentation media of recombinant *E. coli* by non-bovine and plant protein hydrolysates. Abstracts of the annual meeting of the Society for Industrial Microbiology, Page 89.

Royan, S. V., Y. Ranganathan, and R. Meganathan. 2005. Evolution of Quinone Biosynthetic Genes in Photosynthetic Bacteria Abstracts of the general meeting of the American Society for American Society for Microbiology. # R-033

Frieders, D.,Y. Ranganathan, R. Becker, R. Meganathan. 2006. *Methylotetracoccus bentleyi* gen. nov., sp. nov., A Novel Facultative Methylotroph. Abstracts of the general meeting of the American Society for American Society for Microbiology. Abstract # R-092

Ranganathan, Y., D. Frieders, R. Meganathan. 2006. Evidence For Plasmid Mediated Carotenoid Biosynthesis From A Novel Facultative Methylotrophic Soil Isolate. Abstracts of the general meeting of the American Society for American Society for Microbiology. Abstract # I-107.

Royan, S.V., and R. Meganathan. 2006. Regulation of the *E. coli* Ubiquinone (Coenzyme Q) Biosynthetic Gene *ubiG.* Abstracts of the General Meeting of the American Society of Microbiology, Abstract #. K-118.

Ranganathan, Y., D. Frieders, R. Meganathan. 2007. Coenzme-Q Biosynthesis: A Novel Pathway for 4-Hydroxybenzoate in Prokaryotes. Abstracts of the General Meeting of the American Society of Microbiology, Abstract #. K-080.

Royan, S. V., W.S. Grayburn and R. Meganathan. 2008. Regulation of a Novel *men*A-*rra*A Operon in *Escherichia coli.* Abstracts of the General Meeting of the American Society of Microbiology, Abstract #. K-130.

Vos, M., G. Esposito, J. N. Edirisinghe, S. Vilain, D. M. Haddad, R Meganathan, V. A. Morais, P. Verstreken. (2011).. Vitamin K_2 is a mitochondrial electron carrier that rescues pink1 deficiency. Abstracts of papers presented at the meeting on NEUROBIOLOGY OF *DROSOPHILA*, Page 308*.* Cold Spring Harbor Laboratory Cold Spring Harbor, New York.

Edirisinghe, J. N. and R. Meganathan (2012). Histodinol-phosphate aminotransferase can Substitute *invivo* for tyrosine aminotransferase in multiple aminotransferase deletion mutants *of Klebsiella oxytoca* Abstracts of the General Meeting of the American Society of Microbiology, Abstract # K-2960.

Kutumbaka, K., W. S. Grayburn, R. Meganathan (2013). The RNA Esre is not essential for the survival of *Escherichia coli*. Abstracts of the General Meeting of the American Society of Microbiology, Abstract # K-1091.

INVITED SEMINAR SPEAKER

Department of Microbiology, University of Florida, Gainsville. Vitamin-K (menaquinone) biosynthesis in bacteria-Genes, enzymes and intermediates.

Department of Biotechnology, Agricultural university, Coimbatore, India. Vitamin-K biosynthesis Precursors, intermediates, enzymes and genes.

Department of Microbiology, Loyola University, Stritch School of Medicine. Chicago, Vitamin-K biosynthesis.

Department of Biological Sciences, Illinois State University, Normal, Illinois. Vitamin-K biosynthesis-Precursors, intermediates, enzymes and genes.

Department of Microbiology, Southern Illinois University, Carbondale, Illinois. Vitamin-K (menaquinone) biosynthesis in bacteria - Precursors, intermediates, enzymes and genes.

Novartis Research Institute, Palo Alto, California-Biosynthesis of Vitamin-K.

Department of Microbiology and Molecular Genetics, Michigan State University, East Lansing, MI. Physiology and Molecular Biology of Vitamin K biosynthesis in bacteria.

Department of Biological Sciences, Duquesne University, Pittsburgh, PA. Vitamin-K biosynthesis.

Department of Biological Sciences, National University of Singapore, Singapore. Biochemisry, Genetics and Molecular biology of vitamin-K biosynthesis –September 2003.

Korea Research Institute of Bioscience and Biotechnology (KRIBB), Daejeon, South Korea. Biochemisry, Genetics and Molecular biology of vitamin-K biosynthesis –August 2003

Centre for DNA Fingerprinting & Diagnostics, Hyderabad, India. Biochemisry, Genetics and Molecular biology of vitamin-K biosynthesis – September 2003.
Department of Biotechnology, Agricultural University, Coimbatore, India, Higher education in USA – August 2003.

Department of Microbiology & Molecular Genetics, Oklahoma State University, Stillwater, Oklahoma. "Biochemistry, genetics and Molecularbiology of Vitamin-K biosynthesis". March 2004.

“International conference on "Recent Advances in Bioengineering" held at the School of biotechnology, SRM University, Kattankulathur, Tamil Nadu, India from February 7th to 9th, 2008. I gave one of the three opening addresses: Minimal nutritional requirement and minimum genome size are on the opposite ends of the spectrum.

Biosynthetic pathways for vitamins K1 and K2 and coenzyme Q: Targets for chemotherapeutics and herbicides. 13th Annual Symposium on Industrial and Fermentation Microbiology, La Crosse, WI, May 2009

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Journal of Industrial Microbiology and Biotechnology
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DIRECTION OF THESES AND DISSERTATIONS AT NORTHERN

Kirthi Kutumbaka**.** Identification and characterization of the coenzyme Q biosynthetic gene *yigP* as *ubiJ* and studies on *ubiB.* Ph.D. 2013.

Janaka Edirisinghe. Coenzyme-Q Biosynthesis: A Novel Pathway for *p*-Hydroxybenzoic Acid in *Klebsiella oxytoca.* Ph.D. 2011.

S. Royan. Regulatory studies on selected quinone biosynthetic genes in *Escherichia coli*. Ph.D. 2006.

R. Daruwala. Menaquinone (Vitamin K_2) biosynthesis in *Escherichia coli*: Sequencing of a new gene (*menF*) and characterization of the encoded isochorismate synthase. Ph.D. 1997.

O. Kwon. Vitamin K_2 (menaquinone) biosynthesis in *Escherichia coli*: Overexpression, purification, and characterization of *o*-succinylbenzoil-coenzyme A synthetase. Ph.D. 1997.

C. Palaniappan. Menaquinone (vitamin K_2) biosynthesis in *Escherichia coli*: Identification and characterization of the bifunctional enzyme encoded by the *menD* gene. Ph.D. 1994.

K. Suvarna. Menaquinone (vitamin K_2) biosynthesis in *Escherichia coli*: Cloning, nucleotide sequence and expression of the *menA* gene. Ph.D. 1994.

Ben Sanchez. Methionine sulfoxide as an electron acceptor for anaerobic growth of *Escherichia coli*. M.S.

Lynne Miguel. Dimethyl sulfoxide respiration in *Proteus mirabilis* and *Escherichia coli* M.S.

Jim Schrementi. Reduction of Tetrahydrothiophene l-oxide by *Escherichia coli* M.S.

Carolina Diaz-Rodriguez. Nicotinamide N-oxide as an electron acceptor for*Escherichia coli.* M.S.

Adeline Valentine-Serano. Inability of *Proteus mirabilis* mutants to reduceN-oxides and sulfoxide. M.S.

Rushad Daruwala. Dimethyl sulfoxide reductase is not required for trimethylamine N-oxide reduction in *Escherichia coli*. M.S.

Anna Kotsakis. Ubiquinone (Coenzyme Q) biosynthesis in *Escherichia coli*: Isolation and identification of *ubiF* gene. M. S.

John Robbins. Ubiquinone (Q) biosynthesis in *Klebsiella pneumoniae;* Evidence for the formation of 4-hydroxybenzoate from tyrosine. M. S.

Mik Balogh. Menaquinone requirement for the expression of plasmid encoded hydrogen sulfide production in *Escherichia coli*. M.S. (non-thesis research).

Mohd Hashim. Nicotinamide N-oxide and nicotinic acid N-oxide as electron acceptors for anaerobic growth of *Proteus mirabilis*. M.S. (non-thesis research).

POSTDOCTORAL FELLOWS

Dr. Vijay Sharma-1989-1992
Dr. David Stevenson-1995-1997
Dr. Dipak Bhattacharyya-1995-1997
Dr. E.S. Yergul-1997-1999
Dr. K. Ravi, 1998-2000
Dr. Yamini Ranganathan

THESES AND DISSERTATION COMMITTEES AT NORTHERN

Chairman, Ph.D. dissertation committees for the following:

C. Palaniappan
K. Suvarna
O. Kwon
R. Daruwala
S. Royan
J. Edirisinghe
J. Gundu,
K. Kutumbaka

Member, Ph.D. dissertation committees for the following:

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D.L. Cochran Stafira
Prins Nevhutalu
Yi-Ping Tao
Debra Hudspeth
Margaret O'Brian
Nick Bohall
David Stevenson
Susan Staffaei
Andrew Iverson

Chairman, M.S. committees for the following:

Ben Sanchez
Lynne Miguel
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Carolina Diaz-Rodriguez
Adeline Valentine-Serono

Mick Balogh
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Member, M.S. committees for the following:

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Kirk Rutledge
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Jongyun Heo

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Sarah Hatch
Travis Miller
Reagan Mukazi
Garett Carlson
Yamini Patel

UNIVERSITY SERVICE:

1. College council (2 year term)-3X times
2. Advisory committee (2 year term)
3. Space and scheduling committee (1 year term)
4. Chemical waste disposal committee (1 year term)
5. Seminar committee (2 year term)
6. Library committee (2 year term)
7. PMBC personnel committee (4 years)
8. Personnel committee (1 year term)
9. Policy committee (1 year term)
10. Graduate committee
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COURSES TAUGHT

Bios 205, Prokaryotes part-once a year.
Bios 313, Introductory Microbiology. once a year.
Bios 370, Independent study, Undergraduate, every year.
Bios 413, Microbial Physiology. once a year.
Bios599A M. S. thesis research
Bios 670, Independent study, graduate, every year.
Bios 661A Microbiology seminar-once in two years.
Bios 799 Bios 699 Ph. D. thesis research
Bios 761A Microbiology seminar-once in two years.