

Gopal Raj Periyannan

Research Interests

Biochemistry of metalloenzymes
Role of metalloproteases in cell signaling and cancer metastasis
Metalloproteases from *Caulobacter crescentus* and *Schizosaccharomyces pombe*
Spectroscopic characterization of metalloenzyme active sites and reaction intermediates

Biofuels: Enzymatic breakdown of plant polysaccharides

Education

Ph. D. in Chemistry Miami University, Oxford, OH; Dec 2004

Dissertation Title Characterization of metallo- β -lactamase L1 from *Stenotrophomonas maltophilia*
Research Advisor: Professor Michael W Crowder

BSc. (Hons.) University of Peradeniya, Sri Lanka; April 1996
Major: Chemistry; Minor: Botany
Research: Biological activity of the natural product plumbagin

Professional Experience

(1) Post Doctoral Fellow, WI. Dept. of Biophysics Medical College of Wisconsin, Milwaukee, WI.
Nov 2004 - July 2006

(2) Adjunct Lecturer, Dept. of Natural Sciences, Carroll College, Waukesha, WI. Jan 2006 - May 2006

Grants

- (1) 2006 Cloning, Overexpression, Purification and Characterization of a Membrane Metalloprotease from the yeast *Schizosacchomyes pombe*: A Model for Human Prostate Specific Membrane Antigen, a Member of GCPII Group of Proteins. Eastern Illinois University, Council for Faculty Research - \$ 3,582.
- (2) 2006 Characterization of a Novel Metalloprotein from *Caulobacter crescentus*. Eastern Illinois University, Early research Support Grant from College of Sciences - \$ 500
- (3) 2007 Cloning, over Overexpression, of a Membrane Metalloprotein from the yeast *Schizosacchomyes pombe*. Eastern Illinois University, Undergraduate Research Council Award (Timothy Russell) - \$ 500
- (4) 2007 Overexpression, Purification and Characterization of a Metalloprotease from *Caulobacter crescentus*. Eastern Illinois University, Council for Faculty Research – Not Funded

Awards and Honors

William H Charch Graduate Fellowships, Miami University 2000, 2001, 2002

R T Davidson Graduate Award for outstanding performance in graduate studies, Miami University, OH 2003

Publications

1. Amit Kumar, Gopal Raj Periyannan, Beena Narayanan, Aaron W. Kittell, Jung-Ja Kim and Brian Bennett. Experimental evidence for a metallohydrolase mechanism in which the nucleophile is not delivered by a metal ion: EPR spectrokinetic and structural studies of aminopeptidase from *Vibrio proteolyticus*. *Biochem J.* (2007) May 1;403(3):527-36.
2. M.L. Matthews, G. Periyannan, T.K. Sigdel, C. Hajdin, B. Bennett, and M.W. Crowder, "Probing the reaction mechanism of the *D*-ala-*D*-ala dipeptidase, VanX, by using stopped-flow kinetic and rapid-freeze quench EPR studies on the Co(II)-substituted enzyme" *J. Am. Chem. Soc.* (2006) Oct 11;128(40):13050-1.
3. A. L. Costello, G. Periyannan, K.-W. Yang, M. W. Crowder and D. L. Tierney, "Site Selective Binding of Zn(II) to Metallo- β -Lactamase L1 from *Stenotrophomonas maltophilia*", (2006) *JBIC*, Apr;11(3):351-8.
4. Gopal R. Periyannan, A.L. Costello, D.L. Tierney, K.W. Yang, B. Bennett, and M.W. Crowder, "Sequential Binding of Co(II) to Metallo- β -Lactamase CcrA" *Biochemistry* (2006) Jan 31;45(4):1313-1320.
5. G.P.K. Marasinghe, I.M. Sander, Brian Bennett, Gopal R Periyannan, Ke-Wu Yang, C.A. Makaroff, and M.W. Crowder, "Structural Studies on a Mitochondrial Glyoxalase II", *J. Biol. Chem.*(2005); 280 (49) 40668 - 40675.
6. Gopal Raj Periyannan, Patrick Shaw, Tara Sigdel and Michael W. Crowder, "In vivo folding of recombinant metallo- β -lactamase L1 requires the presence of Zn(II)", *Protein Science* (2004) 13:2236-2243.
7. Anne L. Carenbauer, James D. Garrity, Gopal Periyannan, Robert B. Yates, and Michael W. Crowder, "Probing substrate binding to Metallo- β -lactamase L1 from *Stenotrophomonas maltophilia* by using site-directed mutagenesis", *BMC Biochem.* (2002); 3 (1): 4.
8. Crowder, Michael W., Yang, Ke-Wu, Carenbauer, Anne L., Periyannan, Gopal, Seifert, Mary E., "The Problem of Solvent Exposable disulfide when Preparing Co (II)-Substituted Metallo- β -lactamase L1 from *Stenotrophomonas maltophilia*",(2001) *JBIC* 6, 91-99.

Published Abstracts

1. Kumar, A., Narayanan, B., Periyannan, G., Kowalski, J., Francis, D., Kim, J-J. and Bennett B: A Novel Proteolytic Mechanism for *Vibrio proteolyticus* Aminopeptidase. Gordon Research Conference on Metals in Biology, Ventura, CA, January 29 – February 03, 2006.
2. Kumar, A., Narayanan, B., Periyannan, G., Funk, A., Bzymek, K. P., Holz, R. C. Kim, J-J. and Bennett, B: Determinants of Substrate Binding in Leucine Aminopeptidase. Gordon Research Conference on Metals in Biology, Ventura, CA, January 29 – February 03, 2006.
3. Kowalski, J., Antholine, W., Periyannan, G., Tierney, D. L., Bennett, B., "Low frequency EPR of Co(II)" Gordon Research Conferences (Metals in Biology), Ventura, CA, Jan 2006.
4. Gopal R Periyannan, Amit Kumar, and Brian Bennett, "Mechanistic Studies on the Aminopeptidase from *Vibrio proteolyticus*", 12th International Conference on Biological Inorganic Chemistry, Ann Arbor, MI, July 31-Aug 5, 2005.

5. Hu Zhenxin, Gopal R Periyannan, Michael W Crowder, “Effect of Zn(II) on the Folding of Metallo- β -Lactamase L1”, 12th International Conference on Biological Inorganic Chemistry, Ann Arbor, MI, July 31-Aug 5, 2005.
6. David L. Tierney, Alison L. Costello, William K. Myers, Michael W. Crowder, Gopal R Periyannan, Patrick Crawford, Brian R. Gibney, Amy K. Petros, Walter Fast, Pei W. Thomas, “Models to Maquettes to Metalloproteins: Cobalt as a Spectroscopic Probe of Zinc Biochemistry”, 12th International Conference on Biological Inorganic Chemistry, Ann Arbor, MI, July 31-Aug 5, 2005.
7. David L. Tierney, Patrick Crawford, Gopal R Periyannan, Ezra C. Depperman, Martin L. Kirk, and Michael W. Crowder, “Structural Studies of Metal-Substituted Metallo- β -Lactamases”, 221st ACS National Meeting, San Diego, CA, April 01 – 05, 2001.

Affiliations

American Chemical Society
Society of Biological Inorganic Chemistry
International EPR Society