

KARUNA CHOUREY, Ph.D
Microbial Ecology and Functional Genomics Group
Environmental Sciences Division
Oak Ridge National Laboratory
Building 1505, MS-6036
Oak Ridge, TN 37831
Tel: 865-574 9046
Fax: 865-576-8646
Email: choureyk@ornl.gov

Education:

- PhD (Molecular Biology) : Bhabha Atomic Research Centre (B.A.R.C), Mumbai, India
- M.Sc (Masters Degree) in Plant Physiology : University of Bombay , Mumbai, India
- B.Sc (Bachelor's degree) in Botany : University of Bombay, Mumbai, India

Research Experience

- (2004- present)** Post Doctoral fellow, Microbial Ecology and Functional Genomics Group, Environmental Sciences Division, Oak Ridge National Lab, Oak Ridge, TN
- (2002-2004)** Post Doctoral fellow, Mammalian Genetics Group, Life Science Division. Oak Ridge National Lab, Oak Ridge, TN
- (1995-2001)** Department of Atomic Energy (DAE) Fellow (Doctoral student), Cell Biology Division, Bhabha Atomic Research Centre, Mumbai, India
- (1992-1994)** Research Fellow, Hindustan Lever Research Center (Indian chapter of Unilever, UK), Mumbai, India

Professional Skills and techniques known:

I am well versed in working with mammalian systems, plant systems and microbes.

Molecular Biology Techniques:

Whole Genome **Microarray**, Real-Time PCR (RT-PCR), **Targetted deletion Mutagenesis**, Insertional mutagenesis, Western blotting, southern blotting and northern blotting techniques. 1-D and **2-D SDS-PAGE**, **Protein tagging**, protein-protein interactions using pull-down assays, *in vivo radiolabeling of the proteins*, **autoradiography and fluorography**. Preparing samples for mass spectroscopy and analyzing the data generated by mass spectroscopy.

Cell Biology Techniques

Generating MEF (mouse embryo fibroblasts) cells, establishing cell lines, transfections. Immunostaining of cells, analysis of spindle and microtubule structure, cell division abnormalities, studying chromosomal abnormalities using **Q-FISH** protocol, **Flow cytometry** techniques for assessing apoptosis. Immunological techniques required for **raising antibodies** in rabbits.

Hydroponics and plant tissue culture. Mammalian cell culture, working with lab animals like mice and rabbits. Working with microorganisms in aerobic or anaerobic conditions using glove box.

Imaging Techniques

Live-cell imaging (preparation of cells and analysis) using Open lab software. **Atomic Force microscopy (AFM)** and **Confocal Microscopy** image acquisition and analysis.

Radiological Techniques

Trained to work with **Radioisotopes, Gamma-ray irradiators, X-ray irradiators, Scintillation counters, whole body irradiation in animals with followup care. *in vivo* radiolabeling** of the proteins, **autoradiography and fluorography** .

Proposals written:

Assessing the Impact of Environmental Parameters on Cellular Dynamical Processes Underlying Heavy Metal Resistance and Reduction, Submitted to DOE- NABIR (*Natural and Accelerated Bioremediation Research Program*), Program Element: Biomolecular Science and Engineering [Office of Science Program Notice LAB 05-05].

Investigators: D. K. Thompson (PI) S. D. Brown, **Karuna Chourey**, S. Brooks, P. Jardine, J. Morrell, S. E. Fendorf and M. Doktycz.

I have attended a one-day workshop on bioinformatics and computational biology, sponsored by NCBI (National Center for Biotechnology Information) at University of Tennessee, Knoxville. This included lectures and 'hands on' training.

Publications and presentations

Accumulation of LEA proteins in salt (NaCl) stressed young seedlings of rice (*Oryza sativa* L.) cultivar Bura Rata and their degradation during recovery from salinity stress (2003) **K. Chourey**, S. Ramani, S. Kumar Apte *Journal of Plant Physiology*, Issue 10, 1165-1174.

Quantitative Comparison of mitotic spindles via confocal image analysis. Jeffery Price, Yie Liu, **Karuna Chourey**, Deniz Aykac and Shaun Gleason, July/August 2005 *Journal of Biomedical Optics* Volume 10, 044012

Cellular Response of *Shewanella oneidensis* to Nonradioactive Strontium Stress (under review). Steven D. Brown, Madhavi Martin, Sameer Deshpande, Sudipta Seal, Katherine Huang, Eric Alm, Yunfeng Yang, Liyou Wu, Tingfen Yan, Xueduan Liu, Adam Arkin, **Karuna Chourey**, Jizhong Zhou, and Dorothea K. Thompson.

Molecular Dynamics of the *Shewanella oneidensis* Response to Chromium Stress. (to be submitted) Steven D. Brown, Melissa Thompson, Nathan C. VerBerkmoes, **Karuna Chourey**, Manesh Shah, Robert L. Hettich, Jizhong Zhou, and Dorothea K. Thompson.

VPARP associates with microtubules and centrosomes and is not essential for chromosome stability and DNA damage repair (to be submitted) **Karuna Chourey**, Lea Harrington, Valerie A. Kickhoefer and Yie Liu.

Molecular Profile of Chromium-Adapted *Shewanella oneidensis* MR-1. (to be submitted) **Karuna Chourey**, Melissa Thompson, Nathan C. VerBerkmoes, Steven D. Brown, Jennifer Morrell-Falvey, Manesh Shah, Robert L. Hettich, and Dorothea K. Thompson.

Elucidating the Role of Two Mammalian Telomerase-Associated Protein components *In Vivo* - *TERT* and *VPARP*. Liu, Yie, Bryan E. Snow, Wen Zhou, Natalie Erdmann, **Karuna Chourey**, Marla Gomez, Murray O. Robinson, and Lea Harrington. Presented at the U.S. Department of Energy Genome Meeting, Santa Fe, New Mexico, March 30- April 2 2003.

Proteome characterization of Chromium-shocked and Chromium-adapted *Shewanella oneidensis* MR-1. M. Thompson, N. VerBerkmoes, **K. Chourey**, S. Brown, D. Thompson and R. Hettich. Presented at Association of Biomolecular Resource Facilities Annual Meeting, Savannah, GA, February 5-8, 2005.

Systems Biology Approach to Understanding Chromium(VI) Stress Response and Adaptation of *Shewanella oneidensis*. **K. Chourey**, S. Brown, M. Thompson, N. VerBerkmoes, J. Morrell-Falvey, R. Hettich, J. Zhou, and D. K. Thompson. Presented at "Celebrate Women in Science" organized by ORNL's Committee for Women and Women's History Month Committee on March 29, 2005.

Transcriptome and Proteome Dynamics of Cellular Response of *Shewanella oneidensis* to Chromium Stress. Steven D. Brown, **Karuna Chourey**, Nathan C. VerBerkmoes, Melissa Thompson, Robert L. Hettich, and Dorothea K. Thompson. Presented at The Department of Energy's Natural and Accelerated Bioremediation Research Program (NABIR) 8th annual all-PI meeting - April 18-20, 2005. The conference was held at the Airlie Conference Center in Warrenton, VA.

Proteome Characterization of Chromium-Shocked and Chromium-Adapted *Shewanella oneidensis* MR-1. D. K. Thompson, M. R. Thompson, N. C. VerBerkmoes, S. D. Brown, **K. Chourey**, and R. L. Hettich. Presented at American society of microbiology's 105th General meeting- June 509, 2005 at Atlanta , Georgia.

Transcriptome Analysis of *Shewanella oneidensis* MR-1 Shocked with Hexavalent Chromium Steven. D. Brown, **Karuna Chourey**, Sudipta Seal, Sameer Deshpande, Jizhong Zhou, and Dorothea K. Thompson. Presented at American society of microbiology's 105th General meeting- June 509, 2005 at Atlanta , Georgia.

Transcriptomics of Chromium-Adapted *Shewanella oneidensis* MR-1. **K. Chourey**, S. D. Brown, J. Morrell-Falvey, M. Doktycz, D. K. Thompson. Presented at American society of microbiology's 105th General meeting- June 509, 2005 at Atlanta , Georgia.

Proteome Characterization of Chromium-shocked and Chromium-adapted *Shewanella oneidensis* M. Thompson, N. VerBerkmoes, **K. Chourey**, S. Brown, D. Thompson and R.

Hettich. Presented at 13th Annual International Meeting on Microbial Genomics September 11th-15th, 2005 Lowell Conference Center University of Wisconsin-Madison Madison, WI.

Academic highlights and other work experience

- Was a Merit student from 1987-1990 (Bachelors degree)
- Recipient of University of Bombay Scholarship 1990-1991
- Recipient of Daxina Fellowship 1991-1992
- Stood First in the University of Bombay Merit List for Botany in 1992 (Masters degree)
- Worked as a lecturer in Biology (SM Lal Coaching Classes), Mumbai, India (1994-1995)
- Qualified the State Eligibility Test (SET) for lecturership (at Masters level)- 1995
- Awarded the Department of Atomic Energy (DAE) Fellowship for doctoral work to be carried out at BARC, Mumbai, INDIA (1995-2001)

Abstracts of my work:

(2004- present) Oak Ridge National Lab, Oak Ridge, TN

Post Doctoral fellow, Microbial Ecology and Functional Genomics Group, Environmental Sciences Division

I am currently working on DOE sponsored Natural and Accelerated Bioremediation Research (NABIR) project. The overall goal of this DOE NABIR project is to characterize the molecular basis and regulation of hexavalent chromium [Cr(VI)] stress response and reduction by *S. oneidensis* MR-1. I have examined the molecular and physiological effects of short term and long term exposure to chromium in *S. oneidensis* MR-1. Whole-genome DNA microarrays for *S. oneidensis* MR-1 was used to generate transcriptome profiles of the chromium treated cells. The transcriptome profile thus generated was compared with the proteome profile at the same data point using HPLC-NanoESI-MS/MS mass spectroscopy techniques. I have also investigated the effects of chromium on cells *per se* using confocal microscopy and atomic force microscopy (AFM). Deletion mutants have been generated for genes which were prominently induced in response to chromium stress. I am presently characterizing them to understand the role of these genes in the chromium reduction pathway. I have also worked on effects of Strontium on MR-1 using microarrays and proteomics approach.

Funding provided by DOE- NABIR project.

(2002-2004) Oak Ridge National Lab, Oak Ridge, TN

Post Doctoral fellow, Mammalian Genetics Group, Life Science Division.

The main project was focused on elucidating the functions of VPARP *in vivo*. VPARP (vault-polyadeno-ribose polymerase), which was discovered in 1999, belongs to a superfamily of PARP (polyadeno-ribose polymerase) domain containing proteins. Members of PARP family are believed to be involved in a variety of cellular events, including modulation of chromatin structure, DNA synthesis, DNA repair, gene transcription and cell cycle regulation. The

objective of this study was to find out what was the role of VPARP in a cell. Also the interactions of VPARP with other members of PARP family was investigated.

VPARP knockout mice were used for the studies to see the effect of VPARP deletion on mice as well as MEF (mouse embryo fibroblasts). VPARP knockout mice were also analyzed for their response to DNA damage, and were evaluated for response to many different kinds of abiotic stresses. The role of VPARP in cell division was also investigated.

Funded by ORNL -LDRD project.

(1995-2001) Bhabha Atomic Research Centre, Mumbai, India
PhD Student, Cell Biology Division

Topic of dissertation: 'Responses of rice, *Oryza sativa* L. cultivars to abiotic stresses'

I investigated the effects of abiotic stresses such as salinity, gamma radiation and drought, on a local salt tolerant rice cultivar Bura Rata. The work was mainly focused on studying the signal transduction and gene expression during the above mentioned stresses.

Funded by Department of Atomic Energy (DAE), Government of INDIA.

(1992-1994) Hindustan Lever Research Center (Indian chapter of Unilever, UK),
Mumbai, India
Research Fellow, Agriculture Section

Work was mainly focused on isoenzyme patterning of different cultivars of maize and study of different varieties of tomato by using Restriction Fragment Length Polymorphism (RFLP). Also worked with different varieties of rice with respect to peroxidase expression pattern. Was shortly involved with tissue culture of tomato plants to study effects of higher concentrations of CO₂.

Funded by Unilever-United Kingdom