Tadahide Izumi
Curriculum Vitae

Education:

Faculty of Science, Kyoto University, Kyoto, Japan	BS	1987	Biology
Faculty of Science, Kyoto University, Kyoto, Japan	MS	1989	Radiation Biology
Faculty of Science, Kyoto University, Kyoto, Japan	Ph.D.	1993	Radiation Biology

1993 - 1998

Post Doctoral Research Associate, Sealy Center for Molecular Science
University of Texas Medical Branch, Galveston

1998 - 2004

Assistant Professor, Human Biological Chemistry and Genetics
Scientist, Sealy Center for Molecular Science
University of Texas Medical Branch

Present

Assistant Professor of Otorhinolaryngology
Louisiana State University Health Sciences Center

Honors: Japan Ministry of Education Fellowship, 1987-1992
Seed Money Fund on Sealy Center on Aging, 1999-2000

Funded grants (as P.I. or Co-P.I.)

1. Seed money grant, Sealy Center on Aging in UTMB
"Construction of transgenic mice over-expressing APE1 and its effect on Aging"
As **P.I**.
Funding period: 1999-2000, total $10,000

2. Department of Energy, Office of Science Notice 00-02:
Experimental and Computational Structural Biology
"Molecular recognition of DNA damage sites by apurinic/apyrimidinic endonucleases"
As **Co-P.I**.
Funding period: 2000-2004
Total budget (includes supply and personnel only) $205,050

3. NIH R01
"Repair of oxidative DNA damage in mammalian cells"
As **P.I**.
Period to be funded: 2003-2007 total budget to be funded: $260,750

Membership of Professional Societies:

1993-2002 American Society of Microbiology

Research subject:

DNA damage and mutagenesis, specifically those generated by reactive oxygen species; mechanisms of cellular defense and DNA repair against the DNA damage in human cells and other organisms.

Technical experience:

Most experimental skills and knowledge relevant to current biology are mastered. Examples are:

1. Molecular Biology
   - Isolation and purification of DNA and RNA
   - Cloning of recombinant DNA
   - Expression and purification of recombinant protein
   - Site-directed and randomized mutagenesis of recombinant DNA
   - Enzymology
   - Southern, Northern, and Western blotting
   - Electric mobility shift assay (EMSA)
2. Cell biology
   - Transient and stable transfection of recombinant DNA into cells
   - Analysis of promoters of genes
   - Purification and depletion of protein by immunoaffinity chromatography
   - Immunohisochemistry
3. Animal experiment (mouse)
   - Routine procedures, i.e., colony maintenance, tail snipping, tissue extraction, blood sampling from inferior vena cava; RNA, DNA, protein extraction from tissues

Publications:

Izumi, T., Ishizaki, K., Ikenaga, M., Yonei, S. (1992) A mutant endonuclease IV of *E. coli* loses the ability to repair lethal DNA damage induced by hydrogen peroxide but not that induced by methyl methanesulfonate. *J. Bacteriol.* **174**: 7711-7716.

Tatsuka, M., Ibeanu, G.C., Izumi, T., Narayan, S. Ramana, C. V., Kim, N. K., Kang, W., Roy, G., and Mitra, S. (1995) Structural organization of the mouse DNA repair gene, N-methylpurine-DNA glycosylase. *DNA and Cell Biology* **14**: 37-45.

Izumi, T., Henner, W. D., and Mitra, S. (1996) Negative regulation of the major human AP-endonuclease, a multifunctional protein. *Biochemistry* **35**: 14679-14683.

Mitra, S., Hazra, T. K., Roy, R., Ikeda, S., Biswas, T., Lock, J., Boldogh, I., and Izumi, T. (1997) Complexities of DNA base excision repair in mammalian cells. *Mol. Cells*. **7**: 305-312.

Izumi, T., Tatsuka, M., Tano, K., Asano, M., and Mitra, S. (1997) Molecular cloning and characterization of the promoter of the human N-methylpurine-DNA glycosylase (MPG) gene. *Carcinogenesis* **18**: 1837-1839.

Roy, R., Biswas, T, Hazra, T. K., Roy, G., Grabowski, D. T., Izumi, T., Srinivasan, G., and Mitra, S. (1998) Specific Interaction of wild type and truncated mouse N-methylpurine-DNA glycosylase with ethenoadenine-containing DNA. *Biochemistry* **37**: 580-589.

Izumi, T. and Mitra, S. (1998) Deletion analysis of human AP-endonuclease: Minimum sequence required for the endonuclease activity. *Carcinogenesis* **19**: 525-527.

Ramana, C. V., Boldogh, Izumi, T., and Mitra, S. (1998) Activation of apurinic/apyrimidinic endonuclease in human cells by reactive oxygen species and its correlation with their adaptive response to genotoxicity of free radicals. *Proc. Natl. Acad. Sci. USA* **95**: 5061-5066.

Takemoto, T., Zhang, Q.M., Matsumoto, Y., Mito, S., Izumi, T., Ikehata, H., and Yonei, S. (1998) 3'-Blocking damage of DNA as a mutagenic lesion caused by hydrogen peroxide in *Escherichia coli*. *J. Radiat. Res*. **39**: 137-144.

Mitra, S., Izumi, T., Boldogh, I., Ramana, C. V., Hsieh, CC, Saito, H., Lock, and J., Papaconstantinou, J. (1999) Repair of oxidative DNA damage and aging: central role of AP-endonuclease. *Proc. NATO Asi. Monograph*. Prenum Press, 295-311.

Ikeda, S., Biswas, T., Roy, R., Izumi, T., Boldogh, I., Kurosky, A., Sarker A. H., Seki, S., and Mitra, S. (1998) Purification and characterization of a human homolog (hNTH1) of *Escherichia coli* endonuclease III: Direct identification of Lys-212 as the nucleophilic active site. *J. Biol. Chem*. **273**: 21585-21593

Johnson, R. E., Torres-Ramos, C. A., Izumi, T., Mitra, S., Prakash, S., and Prakash, L. (1998) Identification of APN2, the Saccharomyces cerevisiae homolog of the major human AP endonuclease HAP1, and its role in the repair of abasic sites *Gene. Dev*. **12**: 3137-3143.

Edwards, M., Rassin, D. K., Izumi, T., Mitra, S., and Perez-Polo, J. R. (1998) APE/Ref-1 responses to oxidative stress in aged rats. *J. Neurosci. Res.* **54**: 635-638.

Edwards, M., Kent, T. A., Rea, H. C., Wei, J., Quast, M., Izumi, T., Mitra, S., and Perez-Polo, J. R. 1998 APE/Ref-1 Responses to Ischemia in Rat Brain. *Neuroreport* **9**: 4015-4018.

Hazra, T. K., Izumi, T., Maidt, L., Floyd, R. A., and Mitra, S. (1998) The presence of two distinct 8-oxoguanine repair enzymes in human cells: their potential complementary roles in preventing mutation. *Nucleic Acids Res*. **26**: 5116-5122.

Izumi, T., Malecki, J., Chaudhry, M. A., Hill, J. W., Weinfeld, M., Lee, J. C., and Mitra, S. (1999) Intragenic suppression of an active site mutation in the human apurinic/apyrimidinic endonuclease. *J. Mol. Biol.* **287**: 47-57.

Mol, C.D., Izumi, T., Mitra, S., and Tainer, J.A. (2000) Human APE1:DNA structures and mutants reveal abasic DNA binding to stage DNA repair. *Nature* **403**: 451-456.

Izumi, T., Hazra, T.K., Bolodogh, I., Park, M.S., Tomkinson, A., Park, M.S., Ikeda, S., and Mitra,S. (2000) Requirement of human AP-endonuclease in repair of DNA single-strand breaks by reactive oxygen species. *Carcinogenesis* **21**: 1329-1334

Hazra, T.K., Izumi, T., Venkataraman, R., Kow, Y. W., Dizdaroglu, M., and Mitra, S. (2000) Characterization of a novel 8-oxoguanine-DNA glycosylase in E. coli and Its identification as endonuclease VIII. *J. Biol. Chem.* ; **275**:27762-27767

Hill, J.W., Hazra, T.K., Izumi, T. and Mitra, S. (2001) Stimulation of human 8-oxoguanine-DNA glycosylase by AP-endonuclease: potential co-ordination of the initial steps in base excision repair. *Nucleic Acids Res.* **29**:430-438.

Mitra, S., Hazra, T., and Izumi, T. "Nucleic Acid Synthesis". In: Encyclopedia of Physical Science and Technology, Third Edition. Robert A. Myers (ed), Academic Press, San Diego, 2001

Hazra TK, Hill JW, Izumi T, Mitra S. (2001) Multiple DNA glycosylases for repair of 8-oxoguanine and their potential in vivo functions. "Base Excision Repair 2001", Progress in Nucleic Acid Research and Molecular Biology, Academic Press, Moldave K, Mitra S, McCullough AK, Lloyd RS, Wilson SH., **68**: 193-205

Kuninger, D.K., Izumi, T., Papaconstantinou, J., and Mitra, S. (2002) Human AP-endonuclease 1 and hnRNP-L interact with a nCaRE-like repressor element in the AP-endonuclease-1 promoter, *Nucleic Acids Res.*, **30**:823-829.

Hazra, T.K., Izumi, T., Boldogh, T., Imhoff, B., Kow, Y.W., Jaruga, P., Dizdaroglu, M., and Mitra, S. (2002) Identification and characterization of a human DNA glycosylase for repair of modified bases in oxidatively damaged DNA, *Pro. Natl Acad Sci USA*, **99**:3523-3528

Mitra, S., Izumi, T., Boldogh, I., Bhakat K.K., Hill, J.W., and Hazra T.K. (2002) Choreography of oxidative damage repair in mammalian genomes, *Free Radic. Biol. Med.*, **33**: 15-28.

Hazra, T.K., Kow, Y.W., Hatahet, Z., Imhoff, B., Boldogh, I., Mokkapati, S.K., Mitra, S., and Izumi, T. (2002) Identification and characterization of a novel human DNA glycosylase for repair of cytosine-derived lesions., *J. Biol. Chem.* **277**: 30417-30420.

Schein, C.H., Ozgun, N., Izumi T., and Braun, W. (2002) Total sequence decomposition distinguishes functional modules, "molegos" in apurinic/apyrimidinic endonucleases. *BMC Bioinformatics*, **3**: 37-51.

Hazra TK, Izumi T, Kow YW, Mitra S. (2003) The discovery of a new family of mammalian enzymes for repair of oxidatively damaged DNA, and its physiological implications. Carcinogenesis, **24**:155-157.

Izumi. T., Wiederhold, L.R., Roy, G., Roy, R., Jaiswal, A., Bhakat, K.K., Mitra, S., Hazra, T.K. (2003) Mammalian DNA base excision repair proteins: their interactions and role in repair of oxidative DNA damage. Toxicology, **193**: 43-65.

Bhakat, K., Izumi, T., Yang, S., Hazra, T., and Mitra, S. (2003) Role of acetylated human AP-endonuclease (APE1/Ref1) in regulation of the parathyroid hormone gene. EMBO J, **22**: 6299-6309.

Balazs, R., Izumi, T., Mitra, S. (2004) The Major Role of Human AP-endonuclease Homologue Apn2 in Repair of Abasic Sites in Schizosaccharomyces pombe. Nucleic Acids Res., **32**: 1-12.

Izumi, T., Schein, C.H., Oezguen, N., Feng, Y., Braun, W. (2004) Effects of backbone contacts 3' to the abasic site on the cleavage and the product binding by human apurinic/apyrimidinic endonuclease (APE1). Biochemistry, **43**: 684-689.

Jackson, E.B., Naidu, C.V., Mitra, S., Izumi, T. Analysis of nuclear transport signals in the human apurinic/apyrimidinic endonuclease (APE1/Ref1). *submitted to JBC.*