CURRICULUM VITAE Nov. 2008

NAME: Albert Mei-chu Cheh
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DATE OF BIRTH: March 8, 1947 **CITIZENSHIP**: USA

EDUCATION:
University of California, Berkeley, 9/67-12/73; Ph.D. 11/74 (Biochemistry); Sponsor - Dr. J.B. Neilands.
Columbia University, New York, NY 9/63-6/67; B.A. 6/67 (Chemistry)

EMPLOYMENT:
Professor of Chemistry, American University, Washington, DC. 9/95-present; Associate Professor 9/86-8/95; Assistant Professor 9/80-8/86.
Visiting Professor, College of Chemistry and Chemical Engineering, Graduate University of the Chinese Academy of Sciences, Beijing, China, 6/06, 6/07 (summer school course – DNA damage and repair)
Sabbatical leaves 1987, 1993-94 and 2000-2001 - Laboratory of Bioorganic Chemistry, NIDDK, NIH. Sponsor - Dr. Donald M. Jerina.
Visiting Scientist, National Cancer Institute-Frederick Cancer Research Facility. 5/85-8/85. Sponsor - Dr. Anthony Dipple.
Visiting Assistant Research Biochemist, Univ. of California, Berkeley, School of Public Health, Naval Biosciences Lab. 6/83-9/83, 6/84-9/84 Sponsor - Dr. Alex Karu.
Research Scientist, Gray Freshwater Biological Institute, University of Minnesota, Navarre, MN. 11/78-9/80.
NIH Postdoctoral Fellow 10/77-10/78; Postdoctoral Research Associate, 7/74-9/77, Gray Freshwater Biological Institute, University of Minnesota, Navarre, MN. Sponsor -Dr. J.M. Wood.
Postdoctoral Research Associate, University of Illinois, Urbana, IL 1/74-6/74 (lab moved to Minnesota, 7/74)

AWARDS: NIH Postdoctoral Fellowship Award, 1F32 ES05091, 10/77-10/78.
American University award for Outstanding Teaching in the General Education Program, 2004

PUBLICATIONS:
1. Cheh, A. and Neilands, J.B.*, "Zinc, an Essential Metal Ion for Beef Liver δ-Aminolevulinate Dehydratase", *Biochem. Biophys. Res. Commun.* **55,** 1060 (1973).
2. Wood, J.M.*, Segall, H., Ridley, W., Cheh, A., Chudyk, W. and Thayer, J., "Metabolic Cycles for Toxic Elements in the Environment", *Proc. Int. Conf. on Heavy Metals in the Environment*, T. Hutchinson, ed., Environment Canada, Toronto (1975).
3. Cheh, A.M. and Neilands, J.B.*, "The δ-Aminolevulinate Dehydratases-Molecular and Environmental Properties", *Structure and Bonding* **29**, 123 (1976).
4. Ridley, W., Dizikes, L., Cheh, A.M. and Wood, J.M.*, "Recent Studies on Biomethylation and Demethylation of Toxic Elements", *Environ. Health Perspect.* **19**, 43 (1977).
5. Wood, J.M.*, Cheh, A.M., Dizikes, L., Ridley, W.P., Rakow, S. and Lakowicz, J.R., "Mechanisms for the Biomethylation of Metals and Metalloids", *Symp. on Biological and Pharmacological Effects of Metal Contaminants*, E. Bresnick, ed., *Fed. Proc.,* **37,** 16 (1978).
6. Crawford, R.L.*, Robinson, L.E. and Cheh, A.M., "C^{14}-Labelled Lignins as Substrates for the

Study of Lignin Biodegradation and Transformation", in *Lignin Biodegradation: Microbiology, Chemistry and Applications*, T.K. Kirk, T. Higuchi and H.M. Chang, eds. CRC Press, Boca Raton, FL, pp. 61-76 (1980).

7. Cheh, A.M.*, Skochdopole, J., Koski, P. and Cole, L., "Nonvolatile Mutagens in Drinking Water: Production by Chlorination and Destruction by Sulfite", *Science* **207**, 90-92 (1980).
8. Cheh, A.M.*, Hooper, A., Henke, C., Skochdopole, J. and McKinnell, R.G., "A Comparison of the Ability of Frog and Rat S-9 to Activate Promutagens in the Ames Test", *Environ. Mutagenesis* **2,** 487-508 (1980).
9. Cheh, A.M.*, Skochdopole, J., Heilig, C., Koski, P. and Cole, L., "Destruction of Direct Acting Mutagens in Drinking Water by Nucleophiles - Implications for Mutagen Elimination from Drinking Water", in *Water Chlorination: Environmental Impact and Health Effects, Vol. 3*, R.L. Jolley, W. Brungs, and R.B. Cumming, eds., Ann Arbor Science, Ann Arbor, MI, pp. 803-815 (1980).
10. Cheh, A.M.* and Carlson, R.E., "Determination of Potentially Mutagenic and Carcinogenic Electrophiles in Environmental Samples", *Anal. Chem.* **53**, 1001-1006 (1981).
11. Cheh, A.M.* and Carlson, R.E., "Detection and Quantification of Electrophiles in Environmental Samples, II, Labeling of Potential Mutagens in Drinking Water by 4-Nitrothiophenol", In *Advances in the Identification and Analysis of Organic Pollutants in Water, Vol 1*., L.H. Keith, ed, Ann Arbor Science, Ann Arbor, MI, pp. 457-465 (1981).
12. Cheh, A.M.*, Carlson, R.E., Hildebrandt, J.R., Woodward, C.W. and Pereira, M.A., "Contamination of Purified Water by Mutagenic Electrophiles", in *Water Chlorination: Environmental Impact and Health Effects, Vol.* **4***, Book 2*, R.L. Jolley, et al., eds., pp. 1221-1235 (1983).
13. Sweeney, A.G. and Cheh, A.M.*, "Production of Mutagenic Artifacts by the Action of Residual Chlorine on XAD-4 Resin", *J. Chromatogr.* **325**, 95-102 (1985).
14. Cheh, A.M.* "Mutagen Production by Chlorination of Methylated α,ß-Unsaturated Ketones", *Mutation Res.* **169**, 1-9 (1986).
15. Jerina, D.M.*, Cheh, A.M., Chadha, A., Yagi, H. and Sayer, J.M. "Binding of Metabolically Formed Bay-region Diol Epoxides to DNA", in *Proceedings of the 7th International Symposium on Microsomes and Drug Oxidations*, J.O. Miners, D.J. Birkett, R.Drew, B.K. May, M.E. McManus eds., Taylor and Francis, London, pp. 354-362 (1988).
16. Chadha, A., Sayer, J.M., Yeh, H.J.C., Yagi, H., Cheh, A.M., Pannell, L.K. and Jerina, D.M.* "Structures of covalent nucleoside adducts formed from adenine, guanine and cytosine bases of DNA and the optically active bay-region 3,4-diol, 1,2-epoxides derived from dibenz(a,j)anthracene.", *J. Amer. Chem. Soc.* **111**, 5456-5463 (1989).
17. Cheh, A.M.*, Yagi, H. and Jerina, D.M., "Stereoselective Release of Polycyclic Aromatic Hydrocarbon Deoxyadenosine Adducts from DNA by the 32P Postlabeling and DNaseI/Snake Venom Diesterase Digestion Methods", *Chem. Res. Toxicol.* **3,** 545-550 (1990).
18. Chadha, A., Sayer, J.M., Agarwal, S.K., Cheh, A.M., Yagi, H., Yeh, H.J.C. and Jerina, D.M.* "Formation of Covalent Adducts between DNA and Optically Active Bay-region Diol Epoxides of Dibenz(a,j)anthracene", in *Polynuclear Aromatic Hydrocarbons: Measurements, Means and Metabolism*, M.Cooke, K. Loening and J. Merritt, eds, Battelle Press, Columbus, OH, pp. 179-194 (1991).
19. Jerina, D.M.*, Chadha, A., Cheh, A.M., Schurdak, M.E., Wood, A.W. and Sayer, J.M. "Covalent

Bonding of Bay-region Diol Epoxides to Nucleic Acids", in *Biological Reactive Intermediates, IV*, C.M. Witmer, et al., eds., pp. 533-553 (1991).

20. Cheh, A.M., Chadha, A., Sayer, J.M., Yeh, H.J.C., Yagi, H., Pannell, L.K. and Jerina, D.M.* "Structures of Covalent Nucleoside Adducts Formed from Adenine, Guanine and Cytosine Bases of DNA and the Optically Active Bay-region 3,4-Diol, 1,2-Epoxides Derived from Benz[a]anthracene", *J. Org. Chem.* **58**, 4013-4022 (1993).
21. Lakshman, M.K., Xiao, W., Sayer, J.M., Cheh, A.M. and Jerina, D.M.* "Synthesis and Assignment of Absolute Configuration to the N^6-Deoxyadenosine Adducts Resulting from Cis and Trans Ring-Opening of Phenanthrene 9,10-Oxide, *J. Org. Chem.* **59**, 1755-1760 (1994).
22. Bigger, C. A. H., Cheh, A. M., Latif, F., Fishel, R., Canella, K., Stafford, G., Yagi, H., Jerina, D. M. and Dipple, A.* "DNA Strand Breaks Induced by Configurationally Isomeric Hydrocarbon Diol Epoxides", *Drug Metab. Revs.* **26**, 287-299 (1994).
23. Cheh, A. M*, Yagi, H. and Jerina, D. M. "Effect of DNA Base Sequence on the Configuration of Deoxyadenosine Adducts Formed by the Fjord Region Compound, (+)-(1*R*,2*S*,3*R*,4*S*)-3,4-Dihydroxy-1,2-Epoxy-1,2,3,4-Tetrahydrobenzo[c]phenanthrene" *Biochemistry* **33**, 12911-12919 (1994).
24. Lu, C., Yagi, H., Jerina, D.M., and Cheh, A.M*. "Mutational Spectra of the Four Bay Region Diol Epoxides of Benzo[c]phenanthrene and the Drinking Water Mutagen, MX, Determined with an Improved Set of *E.coli lacZ-* Mutants, in *Applications of Molecular Biology in Environmental Chemistry*, R.A. Minear, A.M. Ford, L.L. Needham and N.J. Karch, eds. Lewis Publishers/CRC Press, Boca Raton, FL, pp. 35-44 (1995).
25. Custer, L., Zajc, B., Sayer, J.M., Cullinane, C., Phillips, D.R., Cheh, A.M., Jerina, D.M., Bohr, V.A. and Mazur, S.J.* "Stereoscopic Differences in Repair by Human Cell Extracts of Synthesized Oligonucleotides Containing *trans*-Opened 7,8,9,10-Tetrahydrobenzo[a]pyrene 7,8-Diol 9,10-Epoxide N2-dG Adduct Stereoisomers Located within the Human K-ras Codon 12 Sequence" *Biochemistry* **38**, 569-581 (1999).
26. Chiapperino, D., Kroth, H., Kramarczuk, I. H., Sayer, J. M., Masutani, C., Hanaoka, F., Jerina, D. M. and Cheh, A.M.* Preferential Misincorporation Of Purine Nucleotides By Human DNA Polymerase Eta Opposite Benzo[A]Pyrene 7,8-Diol 9,10-Epoxide Deoxyguanosine Adducts" *J. Biol. Chem.* **277**, 11765-11771 (2002).
27. Chiapperino, D., Cai, M., Sayer, J. M., Yagi, H., Kroth, H., Masutani, C., Hanaoka, F., Jerina, D. M. and Cheh, A.M.* "Error-prone Translesion Synthesis with DNA Polymerase Eta on DNA Containing 7,8-Dihydroxy-9,10-Epoxy-7,8,9,10-Tetrahydrobenzo[a]pyrenyl dA Adducts" *J. Biol. Chem.* **280**, 39684-39692 (2005).

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In preparation

A. Yujian He, Haruhiko Yagi, Donald M. Jerina and Albert M. Cheh* Cytosine Methylation of CpG Increases Yield Of Benzo[c]phenanthrene Diol Epoxide Adducts at Adjacent A and Dibenz[a,j]anthracene Diol Epoxide +2 Adducts at G.

B. Cai, M., Sayer, J.M., Ohashi, E., Ohmori, H., Jerina, D.M. and Cheh, A.M.* "Limited Error-prone Bypass of Benzo[a]pyrene 7,8-Diol 9,10-Epoxide DE-2 Deoxyadenosine Adducts by Human DNA Polymerase Kappa

C. Phillips, T. B., Cai, M., Sayer, J. M., Masutani, C., Hanaoka, F., Jerina, D. M. and Cheh, A.M.*, "Unusual rate acceleration of extension by DNA polymerase Eta at Benzo[c]phenanthrene Diol Epoxide dA adducts"

RESEARCH GRANTS

Principal Investigator:

Freshwater Biological Research Foundation - "Production of Mutagens in Drinking Water", $36,000, 5/78-9/80.

US Dept of Interior, Office of Water Research and Technology agreement through the DC Water Resources Center - "Losses and Artifacts in the Sampling of Chlorinated Waters by XAD Adsorption", $15,567, 3/82-9/82.

NIH - 1R15 ES03904 - "Environmental Analysis by HPLC with ELISA Detection", $65,054, 9/85-5/88.

EPA - R811974-01-0 - "Identification of Environmental Electrophiles", with Co-PI Dr.Robert E. Carlson, $404,150, 5/86-5/90.

NIH - 1R15 CA52043-01 - "PAH Adduct Orientation in DNA", $110,250, 5/90-4/93.

NIH - 1R15 CA/OD74395-01 - "DNA Sequence and PAH Adduct Stereoisomerism", $93,222, 9/97-9/2000.

Co-investigator:

To Principal Investigator Dr. Nancy Gordon - NIH 1R15 CA/GM 43552-01 - Cr(VI) Induced DNA-Protein Crosslinks. $72,868, 9/86-9/89.

To Principal Investigator Dr. Lou Hughes - NIH 1R15 GM42200-01 - Metal Complex Binding to DNA Sequences, $110,250, 4/89-3/92.

MEMBERSHIPS

American Chemical Society, Environmental Mutagen Society (USA), American Association for the Advancement of Science, Federation of American Scientists.

PAID CONSULTANCIES

IGEN, Inc., Rockville MD (Monoclonal Antibody Biotechnology) 1985-87

Hazleton Biotechnologies, Vienna VA (Monoclonal Antibody Biotechnology) 1986-88

National Institutes of Health, LBC, NIDDK, Bethesda MD, 20% time (position = Research Chemist) 1988-1991

National Institutes of Health, LBC, NIDDK, Bethesda MD, 50% time, 10/00-8/01 – half of sabbatical salary was paid by NIH

MISCELLANEOUS

US Patent #4,364,835 granted Dec. 21, 1982 - Sulfite Destruction of Direct Acting Mutagens in Drinking Water.

Reviewer of NSF Grant Proposals, 1982; Amer. Chem. Soc. PRF Program, 1996

Reviewer for *Environmental Mutagenesis*, 1985, Book Reviewer, *J. Amer. Chem. Soc.* 1995, Reviewer for *Mutation Research*, 2000

Internal Reviewer for manuscripts from LBC, NIDDK, NIH

Special Reviewer (NIH), Metabolic Pathology Study Section, 1988; Experimental Therapeutics I Study Section, 1993.

Special Volunteer, National Institutes of Health, LBC, NIDDK, Bethesda MD 1994-2000, 2002 to 2008