

CURRICULUM VITAE

Spring 2020

NAME: Albert Mei-chu CHEH

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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 Emeritus, American University – Environmental Science and Chemistry 9/2017- present

Professor of Environmental Science, 9/2008- present; Chair of Environmental Science 9/2011 – 1/2015;

Professor of Chemistry. 9/95-9/2008, American University, Washington, DC; Associate Professor 9/86-8/95;
Assistant Professor 9/80-8/86.

Visiting Professor (sabbatical leave) Department of Chemical Engineering and Material Science, Michigan State University, East Lansing, MI 48824 1/09-6/09: Sponsor – Professor Bruce Dale

Visiting Professor (sabbatical leave), College of Environmental Science and Engineering, Peking University, Beijing China 9/08-12/08; Sponsor – Dean Yuanhang Zhang

Visiting Professor, College of Chemistry and Chemical Engineering, Graduate University of the Chinese Academy of Sciences, Beijing, China, 6/06, 6/07 (summer short courses – DNA damage and repair)

Research Chemist, 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 -Aminolevulinatase 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 -Aminolevulinatase Dehydratases-Molecular and Environmental Properties", *Structure and Bonding* **29**, 123-169 (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., "¹⁴C-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,β -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 N⁶-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, (+)-(1R,2S,3R,4S)-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-Epoxy 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-Epoxy 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).
 28. Chundawat, S. P.S.*, Bellesia, G., Uppugundla, N., da Costa Sousa, L., Gao, D., Cheh, A.M., Agarwal, U.P., Bianchetti, C.M., Phillips, G.N., Jr., Langan, P., Balan, V., Gunanakaran, S*. and Dale, B.E. "Restructuring the Crystalline Cellulose Hydrogen Bond Network Enhances Its Depolymerization Rate", *J. Amer. Chem Soc.* **133** (29), 11163-11174 (2011)
 29. James F. Humpala, Nirmal Uppugundla, Xiaoyu Tang, Ramin Vismeh, Leonardo Sousa, Shishir P. S. Chundawat, A. Daniel Jones, Venkatesh Balan, Bruce E. Dale and Albert M. Cheh* "Probing the nature of AFEX-pretreated corn stover derived decomposition products that inhibit cellulase activity", *Bioresource Technology*, **152**, 38-45 (2014)

30. Leonardo da Costa Sousa, Mingjie Jin, Shishir Chundawat, Vijay Bokade, Xiaoyu Tang, Ali Azarpira, Fachuang Lu, Utku Avci, James Humpula, Nirmal Uppugundla, Christa Gunawan, Sivakumar Pattathil, Albert Cheh, Ninad Kothari, Rajeev Kumar, John Ralph, Michael G. Hahn, Charles E. Wyman, Seema Singh, Blake A. Simmons, Bruce E. Dale* and Venkatesh Balan* Next-generation ammonia pretreatment enhances biofuel production from biomass via simultaneous cellulose decrystallization and lignin extraction. *Energy & Environmental Science* **9**, 1215-1223 (2016)

*corresponding author

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.

US Fish and Wildlife Service Cooperative Agreement F15AC00742 – "Mutation analyses in support of the study, Monitoring brown bullhead tumors in the tidal Potomac River and the Anacostia River: 2014-2017." \$12,500, 7/2015-7/2017

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, 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, Albert M. Cheh, Inventor

US Patent #9,650,657 granted May 16, 2017 Methods For Producing Extracted And Digested Products

From Pretreated Lignocellulosic Biomass, Shishir P. S. Chundawat, Leonardo D. Sousa, Albert M. Cheh, Venkatesh Balan, and Bruce E. Dale, Inventors
Patent Application (through Michigan State University) July 31, 2013 - Fractionated Extractive Products from Plant Biomass and Methods of Making and Using Same: Shishir P. S. Chundawat, Leonardo D. Sousa, Albert M. Cheh, Venkatesh Balan, and Bruce E. Dale, Inventors
Reviewer of NSF Grant Proposals, 1982, 2012
Reviewer for 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 1987-2008
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