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Date of Birth: May 21, 1961

### **Education:**

New York University, B. S. Chemistry, June 1982

The Cooper Union School of Engineering, B. E. Chemical Engineering, June 1982

Yale University, Ph.D. in Chemistry, May 1988

Thesis Title: Studies on Heterocyclic Derivatives of Tetramethyleneethane

Thesis Advisor: Professor Jerome A. Berson

California Institute of Technology 1988-1990  
American Cancer Society Postdoctoral Fellow  
Advisor: Professor Peter B. Dervan

### **Professional Experience:**

Assistant Professor, Department of Chemistry 1990-1996  
Colorado State University

Associate Professor, Department of Chemistry 1996-1999  
Colorado State University

Professor, Department of Chemistry 1999-2002  
Colorado State University

Professor, Department of Chemistry 2002-2015  
The Johns Hopkins University

Vernon K. Kriable Professor of Chemistry 2016-present  
The Johns Hopkins University

Professor, Department of Biology (secondary appointment) 2015-present  
The Johns Hopkins University

Professor, Department of Oncology (secondary appointment) 2015-present  
The Johns Hopkins University School of Medicine

Member, Sidney Kimmel Comprehensive Cancer Center 2015-present  
Cancer Chemical and Structural Biology Program  
The Johns Hopkins University School of Medicine

**Society Memberships:**

American Chemical Society, 1982-present  
American Association for the Advancement of Science, 1989-present  
Radiation Research Society, 2007-present

**Scholarships and Honors:**

Brenner Research Award in Chemistry, New York University, 1982  
American Institute of Chemists Award, New York University, 1982  
Dox Fellowship, Yale University, 1986-1987  
American Cancer Society Postdoctoral Fellowship, 1988-1990  
Alfred P. Sloan Foundation Fellowship, 1996-2000  
American Association for the Advancement of Science Fellow, 2010  
American Chemical Society, Arthur C. Cope Scholar, 2016

**Advisory Experience:**

Cortech Inc.; Consultant; 1992-1993  
NSF/EPA Partnership in Science Review Panel; Panel member; June 1995  
NSF Research Experience for Undergraduates Review Panel; Panel member; November 1995  
NSF/EPA Partnership in Science Review Panel; Panel member; May 1997  
NSF Organic Chemistry CAREER Program Review Panel; Panel member; November 1997  
NSF/EPA Partnership in Science Review Panel; Panel member; May 1998  
DOE E. O. Lawrence Award in Chemistry; Jury Panel; May 1998  
NIH Bioorganic and Natural Products Study Section; Ad hoc member; June 1998  
Howrey Simon Arnold & White Attorneys at Law; Consultant; June 1998-November 2002  
NIH Biological and Physiological Sciences Special Emphasis Panel; August 1998  
NIH-NCI Site Visit Panel; September 1998  
NIH Center for Scientific Review Special Emphasis Panel; August 1999  
Kalow & Springut LLP Attorneys at Law; Consultant; January 2001-2002  
NIH Bioorganic and Natural Products Study Section; Ad hoc member; February 2002  
NIH Study Section (SSS-B01); member; July 2002  
NIH Center for Scientific Review Special Emphasis Panel; November 2002  
Editorial Advisory Board, *Journal of Organic Chemistry*; January 2003-2010  
NIH Study Section (SSS-L); member; March 2003  
NIH Bioorganic and Natural Products Study Section; member; October 2003–October 2004  
NIH Synthetic and Biological Chemistry A Study Section, member; October 2004–June 2007  
(This study section replaced Bioorganic and Natural Products.)  
Governing Board, Reaction Mechanisms Conference; July 2004– June 2008  
Director, Chemistry-Biology Interface Graduate Program, Johns Hopkins University; September 2005–2013  
NIH NIEHS Special Emphasis Panel; March 2006  
External Advisory Committee, Vanderbilt University; NIH Program Project Grant (Director: Professor Michael Stone); September 2007-2015  
Editorial Advisory Board, *Chemical Research in Toxicology*; January 2008 - 2010  
NIH Mentoring Workshop; Dallas, TX; May 4-6, 2008  
NIH Mentoring Workshop; Irvine, CA; October 18-20, 2009  
Editorial Advisory Board, *Biochemistry*; January 2010-2015  
NSF Chemistry of Life Sciences Review Panel; April 2010

NIH Genes, Genomes, and Genetics - SBIR/STTR review panel; March 2011  
External Advisory Committee; Chemistry Ph.D. Program, City University of New York; March 2011  
NIH Center for Scientific Review Special Emphasis Panel; June 2011  
NIH IMST Cell, Computational, and Molecular Biology - SBIR/STTR review panel; September 2011  
NIH Center for Scientific Review Special Emphasis Panel; November 2011  
American Cancer Society; Cancer Drug Discovery Review Panel; January 2012  
NSF Chemistry of Life Sciences Review Panel (CLP-3); April 2012  
Wilmer Hale; Consultant; January 2013 – January 2016  
External Review Committee for Laboratory of Chemistry, Division of Therapeutic Programs, Office of Biotechnology Products, FDA; January 24, 2013  
NIH Synthetic and Biological Chemistry A Study Section, ad hoc member; October 2015  
NIH Mentoring Workshop; Dallas, TX; May 22-24, 2016  
NCI Special Emphasis Panel – NCI Predoctoral to Postdoctoral Fellow Transition Award (F99/K00); May 2017  
NIH New Innovator Award Review (DP2); ZRG1 MOSS-R70; November 2017  
Fish & Richardson P.C.; Consultant; January 2018 – 2019  
CBI Advisory Committee; University of Delaware; October 2018 –  
Chairperson; NIH Center for Scientific Review Special Emphasis Panel; Biological Chemistry and Macromolecular Biophysics Chemistry; 2019/01 ZRG1 BCMB-H (02) M; November 9, 2018  
Chairperson; NIH Center for Scientific Review Special Emphasis Panel; Biological Chemistry and Macromolecular Biophysics Chemistry Fellowships; 2019/01 ZRG1 F04A-H (20) L; November 15, 2018  
NIEHS Special Emphasis Panel: Revolutionizing Innovative, Visionary Environmental Health Research (RIVER R35) Award Review Meeting; November 14, 2019

### **Publications:**

1. Identification of the Reactive Electronic State in the Photocycloaddition of Alkenes to Cyclic Enones.  
Schuster, D. I.; Greenberg, M. M.; Nunez, I. M.; Tucker, P. C. *J. Org. Chem.* **1983**, *48*, 2615.
2. 3,4-Dimethylenefuran, and 3,4-Dimethylenethiophene, Heterocyclic Analogues of the Disjoint Non-Kekulé Hydrocarbon Tetramethyleneethane.  
Stone, K. J.; Greenberg, M. M.; Goodman, J. L.; Peters, K. S.; Berson, J. A. *J. Am. Chem. Soc.* **1986**, *108*, 8088.
3. The First Magic Angle Spinning NMR Spectrum of a Captive Intermediate: Direct Observation of a Singlet Ground State Biradical, 3,4-Dimethylenefuran.  
Zilm, K. W.; Merrill, R. A.; Greenberg, M. M.; Berson, J. A. *J. Am. Chem. Soc.* **1987**, *109*, 1567.
4. Identity of 3,4-Dimethylenethiophene Reactive Intermediates From Diazene and Bis-Allene Precursors. Correlation of Singlet Biradical Reactivity in the Tetramethyleneethane and Trimethylenemethane Series.  
Greenberg, M. M.; Blackstock, S. C.; Berson, J. A. *Tetrahedron Lett.* **1987**, *28*, 4263.

5. Two Dimensional Solid-State NMR of a Captive Intermediate: Structure of the Radical Centers in 3,4-Dimethylenethiophene.  
Zilm, K. W.; Merrill, R. A.; Webb, G. G.; Greenberg, M. M.; Berson, J. A. *J. Am. Chem. Soc.* **1989**, *111*, 1533.
6. Ground State Multiplicities of 3,4-Dimethylenefuran and 3,4-Dimethylenethiophene. Experimental Tests of Ab Initio and Semiempirical Theories of Heteroatom-Bridged Disjoint Biradicals.  
Greenberg, M. M.; Blackstock, S. C.; Stone, K. J.; Berson, J. A. *J. Am. Chem. Soc.* **1989**, *111*, 3671.
7. Heterocyclic Aromatic Non-Kekulé Molecules. Synthesis and Solution-Phase Chemistry of the Singlet Biradicals 3,4-Dimethylenefuran and 3,4-Dimethylenethiophene.  
Stone, K. J.; Greenberg, M. M.; Blackstock, S. C.; Berson, J. A. *J. Am. Chem. Soc.* **1989**, *111*, 3659.
8. Structure of the Carrier of the CPMAS <sup>13</sup>C NMR Signal Assigned to 3,4-Dimethylenethiophene. Multiple Position Labeling and Chemical Trapping in Annealed Glasses.  
Greenberg, M. M.; Blackstock, S. C.; Berson, J. A.; Merrill, R. A.; Duchamp, J. C.; Zilm, K. W. *J. Am. Chem. Soc.* **1991**, *113*, 2318.
9. Independent Generation of the Major Adduct of Hydroxyl Radical and Thymidine. Examination of Intramolecular Hydrogen Atom Transfer in Competition With Thiol Trapping.  
Barvian, M. R.; Greenberg, M. M. *Tetrahedron Lett.* **1992**, *33*, 6057.
10. Photochemical Cleavage of Oligonucleotides From Solid Phase Supports.  
Greenberg, M. M. *Tetrahedron Lett.* **1993**, *34*, 251.
11. Diastereoselective Synthesis of Hydroxylated Products of Thymidine Resulting from Oxidative Stress.  
Barvian, M. R.; Greenberg, M. M. *J. Org. Chem.* **1993**, *58*, 6151.
12. Cleavage of Oligonucleotides from Solid Phase Supports Using *o*-Nitrobenzyl Photochemistry.  
Greenberg, M. M.; Gilmore, J. L. *J. Org. Chem.* **1994**, *59*, 746.
13. Site Specific Incorporation of the Alkaline Labile, Oxidative Stress Product (5*R*)-5,6-Dihydro-5-hydroxythymidine in an Oligonucleotide.  
Matray, T. J.; Greenberg, M. M. *J. Am. Chem. Soc.* **1994**, *116*, 6931.
14. Kinetic Analysis of the Rearrangement of a Conformationally Constrained  $\alpha$ -Cyclopropyl Benzyl Radical.  
Venkatesan, H.; Greenberg, M. M. *J. Org. Chem.* **1994**, *59*, 3514.
15. A General Method for the Synthesis of C2'-Deuteriated Ribonucleosides  
Cook, G. P.; Greenberg, M. M. *J. Org. Chem.* **1994**, *59*, 4704.

16. Photochemical Release of Protected Oligonucleotides Containing 3'-Glycolate Termini.  
Greenberg, M. M. *Tetrahedron* **1995**, *51*, 29.
17. Benzylic Stabilization as a Mechanistic Tool for Studying Radical Rearrangements.  
Venkatesan, H.; Greenberg, M. M. *J. Org. Chem.* **1995**, *60*, 1053.
18. Reactivity of the Major Adduct of Thymidine and Hydroxyl Radical Generated Via Photoinduced Single Electron Transfer, and the Role of 1,4-Cyclohexadiene in the Photodeoxygenation Process.  
Barvian, M. R.; Barkley, R. M.; Greenberg, M. M. *J. Am. Chem. Soc.* **1995**, *117*, 4894.
19. Independent Generation of 5,6-Dihydrothymid-5-yl, and Investigation of Its Ability to Effect Nucleic Acid Strand Scission Via Hydrogen Atom Abstraction.  
Barvian, M. R.; Greenberg, M. M. *J. Org. Chem.* **1995**, *60*, 1916.
20. Synthesis of Oligonucleotides Containing 3'-Alkyl Carboxylic Acids Using Universal, Photolabile Solid Phase Supports.  
Yoo, D. J.; Greenberg, M. M. *J. Org. Chem.* **1995**, *60*, 3358.
21. Independent Generation and Reactivity of 5,6-Dihydrothymid-5-yl in Single Stranded Polythymidylate. O<sub>2</sub> is Necessary for Strand Scission.  
Barvian, M. R.; Greenberg, M. M. *J. Am. Chem. Soc.* **1995**, *117*, 8291.
22. The Effects of the Ring Fragmentation Product of Thymidine C5-Hydrate on Phosphodiesterases and Klenow (Exo<sup>-</sup>) Fragment.  
Matray, T. J.; Haxton, K. J.; Greenberg, M. M. *Nucleic Acids Research* **1995**, *23*, 4642.
23. Independent Generation and Reactivity of Deoxyurid-1'-yl.  
Goodman, B. K.; Greenberg, M. M. *J. Org. Chem.* **1996**, *61*, 2.
24. Improved Efficiency and Utility of Photolabile Solid Phase Oligonucleotide Synthesis Supports.  
Venkatesan, H.; Greenberg, M. M. *J. Org. Chem.* **1996**, *61*, 525.
25. Synthesis of Oligonucleotides Containing 3'-Alkyl Amines Using Universal, Photolabile Solid Phase Supports.  
McMinn, D. L.; Greenberg, M. M. *Tetrahedron* **1996**, *52*, 3827.
26. A Novel Mechanism for the Formation of Direct Strand Breaks Upon Anaerobic Photolysis of Duplex DNA Containing 5-Bromodeoxyuridine.  
Cook, G. P.; Greenberg, M. M. *J. Am. Chem. Soc.* **1996**, *118*, 10025.
27. DNA Damage Induced Via 5,6-Dihydrothymid-5-yl in Single Stranded Oligonucleotides.  
Greenberg, M. M.; Barvian, M. R.; Cook, G. P.; Goodman, B. K.; Matray, T. J.; Tronche, C.; Venkatesan, H. *J. Am. Chem. Soc.* **1997**, *119*, 1828.

28. Synthesis of Oligonucleotides Containing 3'-Alkyl Carboxylic Acids Using a Palladium Labile Solid Phase Synthesis Support.  
Matray, T. J.; Yoo, D. J.; McMinn, D. L.; Greenberg, M. M. *Bioconjugate Chemistry* **1997**, *8*, 99.
29. C1' Acylated Derivatives of 2'-Deoxyuridine. Photolabile Precursors of 2'-Deoxyuridin-1'-yl.  
Greenberg, M. M.; Yoo, D. J.; Goodman, B. K. *Nucleosides & Nucleotides* **1997**, *16*, 33.
30. Synthesis of Oligonucleotides Containing 3'-Alkyl Amines Using *N*-Isobutyryl Protected Deoxyadenosine Phosphoramidite.  
McMinn, D. L.; Greenberg, M. M. *Tetrahedron Lett.* **1997**, *38*, 3123.
31. Inhibition of Klenow Fragment (exo<sup>-</sup>) Catalyzed DNA Polymerization By (5*R*)-5,6-Dihydro-5-hydroxythymidine and Structural Analogue 5,6-Dihydro-5-methylthymidine.  
Greenberg, M. M.; Matray, T. J. *Biochemistry* **1997**, *36*, 14071.
32. Efficient Solution Phase Synthesis of Oligonucleotide Conjugates Using Protected Biopolymers Containing 3'-Terminal Alkyl Amines.  
McMinn, D. L.; Matray, T. J.; Greenberg, M. M. *J. Org. Chem.* **1997**, *62*, 7074.
33. Stereoselective Synthesis of 3'-Deuterated Pyrimidine Nucleosides Via Stereoselective Reduction of a Protected 3-Oxoribose.  
Chen, T.; Greenberg, M. M. *Tetrahedron Lett.* **1998**, *39*, 1103.
34. The Ring Fragmentation Product of Thymidine C5-Hydrate When Present in DNA is Repaired by the *Escherichia Coli* Fpg and Nth Proteins.  
Jurado, J.; Sapparbaev, M.; Matray, T. J.; Greenberg, M. M.; Laval, J. *Biochemistry* **1998**, *37*, 7757.
35. Post-Synthetic Conjugation of Protected Oligonucleotides Containing 3'-Alkylamines.  
McMinn, D. L.; Greenberg, M. M. *J. Am. Chem. Soc.* **1998**, *120*, 3289.
36. Model Studies Indicate That Copper-Phenanthroline Induces Direct Strand Breaks Via  $\beta$ -Elimination of the 2'-Deoxyribonolactone Intermediate Observed in Ene-diyne Mediated DNA Damage.  
Chen, T.; Greenberg, M. M. *J. Am. Chem. Soc.* **1998**, *120*, 3815.
37. Release of Superoxide From Nucleoside Peroxyl Radicals, A Double Edged Sword?  
Tronche, C.; Tallman, K. A.; Yoo, D. J.; Greenberg, M. M. *J. Am. Chem. Soc.* **1998**, *120*, 4903.
38. Optimization and Mechanistic Analysis of Oligonucleotide Cleavage From Palladium Labile Solid Phase Synthesis Supports.  
Greenberg, M. M.; Matray, T. J.; Kahl, J. D.; Yoo, D. J.; McMinn, D. L. *J. Org. Chem.* **1998**, *63*, 4062.

39. An Orthogonal Solid Phase Support for the Synthesis of Oligonucleotides Containing 3'-Phosphates and Its Application in the Preparation of Photolabile Hybridization Probes.  
McMinn, D. L.; Hirsch, R.; Greenberg, M. M. *Tetrahedron Lett.* **1998**, *39*, 4155.
40. A High Yielding Method For On-Column Derivatization of Protected Oligodeoxynucleotides and its Application to the Convergent Synthesis of 5',3'-Bis-conjugates.  
Kahl, J. D.; McMinn, D. L.; Greenberg, M. M. *J. Org. Chem.* **1998**, *63*, 4870.
41. DNA Damage Induced Via Independent Generation of the Radical Resulting From Formal Hydrogen Atom Abstraction From the C1'-Position of a Nucleotide.  
Tronche, C.; Goodman, B. K.; Greenberg, M. M. *Chemistry & Biology* **1998**, *5*, 263.
42. Direct Evidence For Bimodal DNA Damage Induced By Tirapazamine.  
Daniels, J. S.; Gates, K. S.; Tronche, C.; Greenberg, M. M. *Chem. Res. Toxicol.* **1998**, *11*, 1254.
43. Solution Phase Bioconjugate Synthesis Using Protected Oligonucleotides Containing 3'-Alkyl Carboxylic Acids.  
Kahl, J. D.; Greenberg, M. M. *J. Org. Chem.* **1999**, *64*, 507.
44. Convergent Solution-Phase Synthesis of a Nucleopeptide Using a Protected Oligonucleotide.  
McMinn, D. L.; Greenberg, M. M. *Bioorganic & Med. Chem. Lett.* **1999**, *9*, 547.
45. Introducing Structural Diversity in Oligonucleotides Via Photolabile, Convertible C5-Substituted Nucleotides.  
Kahl, J. D.; Greenberg, M. M. *J. Am. Chem. Soc.* **1999**, *121*, 597.
46. The Effects of Secondary Structure and O<sub>2</sub> on the Formation of Direct Strand Breaks Upon UV-Irradiation of 5-Bromodeoxyuridine-Containing Oligonucleotides.  
Cook, G. P.; Chen, T.; Koppisch, A. T.; Greenberg, M. M. *Chemistry & Biology* **1999**, *6*, 451.
47. Kinetics and Stereoselectivity of Thiol Trapping of Deoxyuridin-1'-yl in Biopolymers and Their Relationship to the Formation of Premutagenic  $\alpha$ -Deoxynucleotides.  
Hwang, J. -T.; Greenberg, M. M. *J. Am. Chem. Soc.* **1999**, *121*, 4311.
48. The Effects of 5R-5,6-Dihydro-5-hydroxythymidine on Duplex DNA Stability and Structure.  
Sambandam, A.; Greenberg, M. M. *Nucleic Acids Research* **1999**, *27*, 3597.
49. Photosensitization of Guanine-Specific DNA Damage by a Cyano-Substituted Quinoxaline Di-N-Oxide.  
Fuchs, T.; Gates, K. S.; Hwang, J. -T.; Greenberg, M. M. *Chem. Res. Toxicol.* **1999**, *12*, 1190.
50. The Reactivity of the 2-Deoxyribonolactone Lesion in Single Stranded DNA and its Implication in Reaction Mechanisms of DNA Damage and Repair.

- Hwang, J. -T.; Tallman, K. T.; Greenberg, M. M. *Nucleic Acids Research* **1999**, *19*, 3805.
51. Reaction of the Hypoxia-Selective Antitumor Agent Tirapazamine with a C1'-Radical in Single-Stranded and Double-Stranded DNA: The Drug and Its Metabolites Can Serve as Surrogates for Molecular Oxygen in Radical-Mediated DNA-Damage Reactions.  
Hwang, J. -T.; Greenberg, M. M.; Fuchs, T.; Gates, K. S. *Biochemistry* **1999**, *38*, 14248.
  52. Synthesis of Modified Oligodeoxyribonucleotides on a Solid-Phase Support Via Derivatization of a Selectively Revealed 2'-Amino-2'-deoxyuridine.  
Hwang, J. -T.; Greenberg, M. M. *Organic Letters* **1999**, *1*, 2021.
  53. Investigation of the Origin of the Sequence Selectivity for the 5-Halo-2'-deoxyuridine Sensitization of DNA to Damage by UV-Irradiation.  
Chen, T.; Cook, G. P.; Koppisch, A. T.; Greenberg, M. M. *J. Am. Chem. Soc.* **2000**, *122*, 3861.
  54. Independent Generation and Reactivity of 2'-Deoxy-5-methyleneuridin-5-yl, a Significant Reactive Intermediate Produced From Thymidine as a Result of Oxidative Stress.  
Anderson, A. S.; Hwang, J. -T.; Greenberg, M. M. *J. Org. Chem.* **2000**, *65*, 4648.
  55. Chemical Evidence for Thiyl Radical Addition to the C6-Position of a Pyrimidine Nucleoside and its Possible Relevance to DNA Damage Amplification.  
Carter, K. N.; Taverner, T.; Schiesser, C. H.; Greenberg, M. M. *J. Org. Chem.* **2000**, *65*, 8375.
  56. AlkA Protein is the Third Escherichia Coli Protein Excising a Ring Fragmentation Product of Thymine.  
Privezentzev, C. V.; Saparbaev, M.; Sambandam, A.; Greenberg, M. M.; Laval, J. *Biochemistry* **2000**, *39*, 14263.
  57. Synthesis and Deprotection of Oligonucleotides Under Aprotic Conditions.  
Chen, T. C.; Fu, J.; Greenberg, M. M. *Organic Letters* **2000**, *2*, 3691.
  58. Synthesis of 2'-Modified Oligodeoxynucleotides via On-Column Conjugation.  
Hwang, J. -T.; Greenberg, M. M. *J. Org. Chem.* **2001**, *66*, 363.
  59. The 2-Deoxyribonolactone Lesion Produced in DNA by Neocarzinostatin and Other Damaging Agents Forms Cross-Links with the Base-Excision Repair Enzyme Endonuclease III.  
Hashimoto, M.; Greenberg, M. M.; Kow, Y. W.; Hwang, J.-T.; Cunningham, R. P. *J. Am. Chem. Soc.* **2001**, *123*, 3161.
  60. Product Studies and Laser Flash Photolysis on Alkyl Radicals Containing Two Different  $\beta$ -Leaving Groups are Consonant with the Formation of an Olefin Cation Radical.  
Bales, B. C.; Horner, J. H.; Huang, X.; Newcomb, M.; Crich, D.; Greenberg, M. M. *J. Am. Chem. Soc.* **2001**, *123*, 3623.



61. Oxygen Dependent DNA Damage Amplification Involving 5,6-Dihydrothymidin-5-yl in a Structurally Minimal System.  
Tallman, K. A.; Greenberg, M. M. *J. Am. Chem. Soc.* **2001**, *123*, 5181.
62. Observation and Elimination of *N*-Acetylation of Oligonucleotides Prepared Using Fast Deprotecting Phosphoramidites and Ultra-Mild Deprotection.  
Zhu, Q.; Delaney, M. O.; Greenberg, M. M. *Bioorganic & Med. Chem. Lett.* **2001**, *11*, 1105.
63. Direct Measurement of Pyrimidine C6-Hydrate Stability.  
Carter, K. N.; Greenberg, M. M. *Bioorganic & Med. Chem.* **2001**, *9*, 2341.
64. Synthesis of Oligonucleotides Containing Fapy•dG (*N*6-(2-Deoxy- $\alpha,\beta$ -D-*erythro*-pentofuranosyl)-2,6-diamino-4-hydroxy-5-formamidopyrimidine).  
Haraguchi, K.; Greenberg, M. M. *J. Am. Chem. Soc.* **2001**, *123*, 8636.
65. Template Free Segmental Synthesis of Oligonucleotides Containing Nonnative Linkages.  
Greenberg, M. M.; Kahl, J. D. *J. Org. Chem.* **2001**, *66*, 7151.
66. Studies on *N*4-(2-Deoxy-D-pentofuranosyl)-4,6-diamino-5-formamidopyrimidine (Fapy•dA) and *N*6-(2-Deoxy-D-pentofuranosyl)-6-diamino-5-formamido-4-hydroxypyrimidine (Fapy•dG)  
Greenberg, M. M.; Hantosi, Z.; Wiederholt, C. J.; Rithner, C. D. *Biochemistry* **2001**, *40*, 15856.
67. Repair of Oxidized Purines and Damaged Pyrimidines by *E. coli* Fpg Protein. Different Roles of Proline-2 and Lysine-57 Residues.  
Saparbaev, M.; Sidorkina, O. M.; Jurado, J.; Privezentzev, C. V.; Greenberg, M. M.; Laval, J. *Environmental and Molecular Mutagenesis* **2002**, *39*, 10.
68. Synthesis and Characterization of Oligodeoxynucleotides Containing Formamidopyrimidine Lesions and Nonhydrolyzable Analogues.  
Haraguchi, K.; Delaney, M. O.; Wiederholt, C. J.; Sambandam, A.; Hantosi, Z.; Greenberg, M. M. *J. Am. Chem. Soc.* **2002**, *124*, 3263.
69. Covalent Trapping of Human DNA Polymerase  $\beta$  by the Oxidative DNA Lesion 2-Deoxyribonolactone.  
DeMott, M. S.; Beyret, E.; Bales, B. C.; Hwang, J. T.; Greenberg, M. M.; Demple, B. J. *Biol. Chem.* **2002**, *277*, 7637.
70. Fapy•dA Induces Nucleotide Misincorporation Translesionally by a DNA Polymerase.  
Delaney, M. O.; Wiederholt, C. J.; Greenberg, M. M. *Angew. Chem. Int. Ed.* **2002**, *41*, 771.
71. Fapy•dG Instructs Klenow Exo<sup>-</sup> to Misincorporate Deoxyadenosine.  
Wiederholt, C. J.; Greenberg, M. M. *J. Am. Chem. Soc.* **2002**, *124*, 7278.
72. A Minor Groove Binding Copper-Phenanthroline Conjugate Produces Direct Strand Breaks Via  $\beta$ -Elimination of 2-Deoxyribonolactone.

- Bales, B. C.; Pitie, M.; Meunier, B.; Greenberg, M. M. *J. Am. Chem. Soc.* **2002**, *124*, 9062.
73. Synthesis of Oligonucleotides and Thermal Stability of Duplexes Containing the  $\beta$ -C-Nucleoside Analogue of Fapy•dG.  
Delaney, M. O.; Greenberg, M. M. *Chem. Res. Toxicol.* **2002**, *15*, 1460.
74. Interaction of DNA Containing Fapy•dA or its C-Nucleoside Analogues with Base Excision Repair Enzymes. Implications for Mutagenesis and Enzyme Inhibition.  
Wiederholt, C. J.; Delaney, M. O.; Greenberg, M. M. *Biochemistry* **2002**, *41*, 15838.
75. Action of Human Apurinic Endonuclease (Ape1) on C1'-Oxidized Deoxyribose Damage in DNA.  
Xu, Y.; DeMott, M. S.; Hwang, J. T.; Greenberg, M. M.; Demple, B. *DNA Repair* **2003**, *2*, 175.
76. Transcription Inhibition Using Modified Pentanucleotides.  
Hwang, J. T.; Baltasar, F. E.; Cole, D.; Sigman, D. S.; Chen, C. B.; Greenberg, M. M. *Bioorganic & Med. Chem.* **2003**, *11*, 2321.
77. Cross-linking of 2-Deoxyribonolactone and its  $\beta$ -Elimination Product by Base Excision Repair Enzymes.  
Kroeger, K. M.; Hashimoto, M.; Kow, Y. W.; Greenberg, M. M. *Biochemistry* **2003**, *42*, 2449.
78. Independent Generation and Study of 5,6-Dihydro-2'-deoxyuridin-6-yl. A Member of the Major Family of Reactive Intermediates Formed in DNA from the Effects of  $\gamma$ -Radiolysis.  
Carter, K. N.; Greenberg, M. M. *J. Org. Chem.* **2003**, *68*, 4275.
79. Synthesis of 5,12-Dioxocyclam Nickel (II) Complexes Having Quinoxaline Substituents at the 6 and 13 Positions as Potential DNA Bis-Intercalating and Cleaving Agents.  
Hegedus, L. S.; Greenberg, M. M.; Wendling, J. J.; Bullock, J. P. *J. Org. Chem.* **2003**, *68*, 4179.
80. Synthesis and Characterization of Oligonucleotides Containing the C4'-Oxidized Abasic Site Produced by Bleomycin and Other DNA Damaging Agents  
Kim, J.; Gil, J. M.; Greenberg, M. M. *Angew. Chem. Int. Ed. Engl.* **2003**, *42*, 5882.
81. Repair of DNA Containing Fapy•dG and its  $\beta$ -C-Nucleoside Analogue by Formamidopyrimidine DNA Glycosylase and MutY.  
Wiederholt C. J.; Delaney M. O.; Pope, M. A.; David, S. S.; Greenberg M. M. *Biochemistry* **2003**, *42*, 9755.
82. Tandem Lesions are the Major Products Resulting From a Pyrimidine Nucleobase Radical.  
Carter, K. N.; Greenberg, M. M. *J. Am. Chem. Soc.* **2003**, *125*, 13376.
83. In Vitro Effects of a C4'-Oxidized Abasic Site on DNA Polymerases.

- Greenberg, M. M.; Weledji, Y. N.; Kroeger, K. M.; Kim, J.; Goodman, M. F. *Biochemistry* **2004**, *43*, 2656.
84. Mutagenic Effects of 2-Deoxyribonolactone in *E. coli*. An Abasic Lesion that Disobeys the A-Rule.  
Kroeger, K. M.; Jiang, Y.; Kow, Y. W.; Goodman, M. F.; Greenberg, M. M. *Biochemistry* **2004**, *43*, 6723.
85. Repair of Oxidized Abasic Sites by Exonuclease III, Endonuclease IV, and Endonuclease III.  
Greenberg, M. M.; Weledji, Y. N.; Kim, J.; Bales, B. C. *Biochemistry* **2004**, *43*, 8178.
86. Evidence for Glycosidic Bond Rotation in a Nucleobase Peroxyl Radical and its Effect on Tandem Lesion Formation  
Hong, I. S.; Carter, K. N.; Greenberg, M. M. *J. Org. Chem.* **2004**, *69*, 6974.
87. Probing the Configurations of Formamidopyrimidines (Fapy•dA, Fapy•dG) in DNA Using Endonuclease IV.  
Patro, J.; Haraguchi, K.; Delaney, M. O.; Greenberg, M. M. *Biochemistry* **2004**, *43*, 13397.
88. Independent Generation and Characterization of a C2'-Oxidized Abasic Site in Chemically Synthesized Oligonucleotides.  
Kim, J.; Weledji, Y. N.; Greenberg, M. M. *J. Org. Chem.* **2004**, *69*, 6100.
89. Effects of the C4'-Oxidized Abasic Site on Replication in *E. coli*. Unusually Large Deletions are Induced by a Small Lesion.  
Kroeger, K. M.; Kim, J.; Goodman, M. F.; Greenberg, M. M. *Biochemistry* **2004**, *43*, 13621.
90. A Comprehensive Comparison of DNA Replication Past 2-Deoxyribose and its Tetrahydrofuran Analogue in *E. Coli*.  
Kroeger, K. M.; Goodman, M. F.; Greenberg, M. M. *Nucleic Acids Res.* **2004**, *32*, 5480.
91. In Vitro Replication and Repair of DNA Containing a C2'-Oxidized Abasic Site.  
Greenberg, M. M.; Weledji, Y. N.; Kroeger, K. M.; Kim, J. *Biochemistry* **2004**, *43*, 15217.
92. Mild Thermal Generation of 5-(2'-Deoxyuridiny)methyl Radical From a Phenyl Selenide Precursor..  
Hong, I. S.; Greenberg, M. M. *Org. Lett.* **2004**, *6*, 5011.
93. Synthesis of Oligonucleotides Containing Fapy•dG (*N*-(2-Deoxy- $\alpha,\beta$ -D-erythropentofuranosyl)-*N*-(2,6-diamino-4-hydroxy-5-formamidopyrimidine)) Using a 5'-Dimethoxytrityl Dinucleotide Phosphoramidite.  
Jiang, Y.; Wiederholt, C. J.; Patro, J. N.; Haraguchi, K.; Greenberg, M. M. *J. Org. Chem.* **2005**, *70*, 141. (PMID: 15624916)
94. Selective Detection of 2-Deoxyribonolactone in DNA.  
Sato, K.; Greenberg, M. M. *J. Am. Chem. Soc.* **2005**, *127*, 2806. (PMID: 15740088)
95. Efficient DNA Interstrand Cross-Link Formation From a Nucleotide Radical.

- Hong, I. S.; Greenberg, M. M. *J. Am. Chem. Soc.* **2005**, *127*, 3692. (PMID: 15771492)
96. The Effect of the 2-Amino Group of 7,8-Dihydro-8-Oxo-2'-Deoxyguanosine on Translesion Synthesis and Duplex Stability  
Oka, N.; Greenberg, M. M. *Nucleic Acids Res.* **2005**, *33*, 1637. (PMID: 15778433)
97. Excision of Formamidopyrimidine Lesions by Endonucleases III and VIII is Not a Major DNA Repair Pathway in *E. coli*.  
Wiederholt, C. J.; Patro, J. N.; Jiang, Y.; Haraguchi, K.; Greenberg, M. M. *Nucleic Acids Res.* **2005**, *33*, 3331. (PMID: 15944451)
98. Mechanistic Studies on DNA Damage by Minor Groove Binding Copper-Phenanthroline Conjugates.  
Bales, B. C.; Kodama, T.; Weledji, Y. N.; Pitié, M.; Meunier, B.; Greenberg, M. M. *Nucleic Acids Res.* **2005**, *33*, 5371. (PMID: 16186134)
99. Preparation and Analysis of Oligonucleotides Containing the C4'-Oxidized Abasic Site and Related Mechanistic Probes.  
Kim, J.; Kreller, C. R.; Greenberg, M. M. *J. Org. Chem.* **2005**, *70*, 8122. (PMID: 16277338)
100. DNA Interstrand Cross-link Formation Initiated by Reaction Between Singlet Oxygen and a Modified Nucleotide.  
Hong, I. S.; Greenberg, M. M. *J. Am. Chem. Soc.* **2005**, *127*, 10510. (PMID: 16045337)
101. Preparation and Analysis of Oligonucleotides Resulting From C5'-Oxidation.  
Kodama, T.; Greenberg, M. M. *J. Org. Chem.* **2005**, *70*, 9916. (PMID: 16292822)
102. Mutagenic Effects of Abasic and Oxidized Abasic Lesions in *Saccharomyces cerevisiae*.  
Kow, Y. W.; Bao, G.; Minesinger, B.; Jinks-Robertson, S.; Siede, W.; Jiang, Y. L.; Kim, J.; Greenberg, M. M. *Nucleic Acids Res.* **2005**, *33*, 6196. (PMID: 16257982)
103. Repair of Formamidopyrimidines in DNA Involves Different Glycosylases.  
Hu, J.; de Souza-Pinto, N. C.; Haraguchi, K.; Hogue, B. A.; Jaruga, P.; Greenberg, M. M.; Dizdaroglu, M.; Bohr, V. A. *J. Biol. Chem.* **2005**, *280*, 40544. (PMID: 16221681)
104. Oxygen Independent DNA Interstrand Cross-Link Formation by a Nucleotide Radical.  
Hong, I. S.; Ding, H.; Greenberg, M. M. *J. Am. Chem. Soc.* **2006**, *128*, 485-491. (PMID: 16402835)
105. Replication of an Oxidized Abasic Site in *Escherichia coli* by a dNTP-Stabilized Misalignment Mechanism that Reads Upstream and Downstream Nucleotides.  
Kroeger, K. M.; Kim, J.; Goodman, M. F.; Greenberg, M. M. *Biochemistry* **2006**, *45*, 5048-5056. (PMC: 1447609)
106. Genetic Effects of Oxidative DNA Damages: Comparative Mutagenesis of the Imidazole Ring-Opened Formamidopyrimidines (Fapy lesions) and 8-Oxopurines in Simian Kidney Cells.

- Kalam, M. A.; Haraguchi, K.; Chandani, S.; Loechler, E. L.; Moriya, M.; Greenberg, M. M.; Basu, A. K. *Nucleic Acids Res.* **2006**, *34*, 2305-2315. (PMCID: PMC1458282)
107. Radiosensitization by a Modified Nucleotide that Produces DNA Interstrand Cross-links Under Hypoxic Conditions.  
Hong, I. S.; Ding, H.; Greenberg, M. M. *J. Am. Chem. Soc.* **2006**, *128*, 2230-2231. (PMID: 16478174)
108. Reactivity of the C2'-Oxidized Abasic Lesion and Its Relevance to Interactions With Type I Base Excision Repair Enzymes.  
Greenberg, M. M.; Kreller, C. R.; Young, S. E.; Kim, J. *Chem. Res. Toxicol.* **2006**, *19*, 463-468. (PMID: 16544953)
109. Synthesis, DNA Polymerase Incorporation, and Enzymatic Phosphate Hydrolysis of Formamidopyrimidine Nucleoside Triphosphates.  
Imoto, S.; Patro, J. N.; Jiang, Y. L.; Oka, N.; Greenberg, M. M. *J. Am. Chem. Soc.* **2006**, *128*, 14606-14611. (PMID: 17090045)
110. Use of Fluorescent Sensors to Determine that 2-Deoxyribonolactone is the Major Alkali-Labile Deoxyribose Lesion Produced in Oxidatively Damaged DNA.  
Xue, L.; Greenberg, M. M. *Angew. Chem. Int. Ed.* **2007**, *46*, 561-564. (PMID: 17154191)
111. Hole Migration is the Major Pathway Involved in Alkali-Labile Lesion Formation in DNA by the Direct Effect of Ionizing Radiation.  
Ding, H.; Greenberg, M. M. *J. Am. Chem. Soc.* **2007**, *129*, 772-773. (PMID: 17243808)
112. Characterization and Mechanism of Formation of Tandem Lesions in DNA by a Nucleobase Peroxyl Radical.  
Hong, I. S.; Carter, K. N.; Sato, K.; Greenberg, M. M. *J. Am. Chem. Soc.* **2007**, *129*, 4089-4098. (PMID: 17335214)
113. Facile Quantification of Lesions Derived from 2'-Deoxyguanosine in DNA.  
Xue, L.; Greenberg, M. M. *J. Am. Chem. Soc.* **2007**, *129*, 7010-7011. (PMID: 17497789)
114. Studies on the Replication of the Ring Opened Formamidopyrimidine, Fapy•dG in *E. coli*.  
Patro, J. N.; Wiederholt, C. J.; Jiang, Y. L.; Delaney, J. C.; Essigmann, J. M.; Greenberg, M. M. *Biochemistry* **2007**, *46*, 10202-10212. (PMID: 17691820)
115. Selective Detection and Quantification of Oxidized Abasic Lesions in DNA.  
Dhar, S.; Kodama, T.; Greenberg, M. M. *J. Am. Chem. Soc.* **2007**, *129*, 8702-8703. (PMID: 17592848)
116. The Human Werner Syndrome Protein Stimulates Repair of Oxidative DNA Base Damage by the DNA Glycosylase Neil1.  
Das, A.; Boldogh, I.; Lee, J. W.; Harrigan, J. A.; Hegde, M. L.; Piotrowski, J.; de Souza-Pinto, N.; Ramos, W.; Greenberg, M. M.; Hazra, T. K.; Mitra, S.; Bohr, V. A. *J. Biol. Chem.* **2007**, *282*, 26591-26602. (PMID: 17611195)

117. DNA Strand Damage Product Analysis Provides Evidence That the Tumor Cell-Specific Cytotoxin Tirapazamine Produces Hydroxyl Radical and Acts as a Surrogate for O<sub>2</sub>. Chowdhury, G.; Junnotula, V.; Daniels, J. S.; Greenberg, M. M.; Gates, K. S. *J. Am. Chem. Soc.* **2007**, *129*, 12870-12877. (PMID: 17900117)
118.  $\gamma$ -Radiolysis Produces Interstrand Cross-links in DNA Involving Thymidine. Ding, H.; Greenberg, M. M. *Chem. Res. Toxicol.* **2007**, *20*, 1623-1628. (PMID: 17939740)
119. Recognition and Repair of Formamidopyrimidines by 8-Oxoguanine Glycosylases. Krishnamurthy, N.; Haraguchi, K.; Greenberg, M. M.; David, S. S. *Biochemistry* **2008**, *47*, 1043-1050. (PMID: 18154319)
120. DNA Tandem Lesion Repair by Strand Displacement Synthesis and Nucleotide Excision Repair. Imoto, S.; Bransfield, L. A.; Croteau, D. L.; Van Houten, B.; Greenberg, M. M. *Biochemistry* **2008**, *47*, 4306-4316. (PMCID: PMC2432464)
121. Facile SNP Detection Using Bifunctional, Cross-Linking Oligonucleotide Probes. Peng, X.; Greenberg, M. M. *Nucleic Acids Res.* **2008**, *36*: e31. (PMCID: PMC2275146)
122. DNA Polymerase Bypass *in vitro* and in *E. coli* of a C-Nucleotide Analogue of Fapy•dG. Wiederholt, C. J.; Weledji, Y. N.; Delaney, M. O.; Greenberg, M. M. *Bioorganic & Med. Chem.* **2008**, *16*, 4029-4034. (PMID: 18242999)
123. Synthesis and Analysis of Oligonucleotides Containing Abasic Site Analogues. Huang, H.; Greenberg, M. M. *J. Org. Chem.* **2008**, *73*, 2695-2703. (PMCID: PMC2424248)
124. Hydrogen Bonding Contributes to the Selectivity of Nucleotide Incorporation Opposite an Oxidized Abasic Lesion by DNA Polymerase. Huang, H.; Greenberg, M. M. *J. Am. Chem. Soc.* **2008**, *130*, 6080-6081. (PMCID: PMC2467393)
125. Self-Promoted DNA Interstrand Cross-link Formation by an Abasic Site. Sczepanski, J. T.; Jacobs, A. C.; Greenberg, M. M. *J. Am. Chem. Soc.* **2008**, *130*, 9646-9647. (PMID: 18593126) (Highlighted in *J. Am. Chem. Soc. Select* collection entitled: *Nucleic Acids: Expanding the Structural and Functional Horizons*, edited by Professor Sidney Hecht *J. Am. Chem. Soc.* **2009**, *131*, 3791-3793; Highlighted (“Spotlight”) in *Chem. Res. Toxicol.* **2008**, *21*, 1650.)
126. Interstrand Cross-link Formation in Duplex and Triplex DNA by Modified Pyrimidines. Peng, X.; Hong, I. S.; Li, H.; Seidman, M. M.; Greenberg, M. M. *J. Am. Chem. Soc.* **2008**, *130*, 10299-10306. (PMCID: PMC2556550)
127. Mechanism of Replication Termination as Revealed by Tus-mediated Polar Arrest of a Sliding Helicase. Bastia, D.; Zzaman, S.; Krings, G.; Saxena, M.; Peng, X.; Greenberg, M. M. *Proc. Natl. Acad. Sci. USA* **2008**, *105*, 12831-12836. (PMID: 18708526)

128. Protein Binding has a Large Effect on Radical Mediated DNA Damage.  
Peng, X.; Pigli, Y.; Rice, P. A.; Greenberg, M. M. *J. Am. Chem. Soc.* **2008**, *130*, 12890-12891. (PMCID: PMC2829750)
129. Multinuclear NMR and Kinetic Analysis of DNA Interstrand Cross-link Formation.  
Ding, H.; Majumdar, A.; Tolman, J. R.; Greenberg, M. M. *J. Am. Chem. Soc.* **2008**, *130*, 17981-17987. (PMCID: PMC2653107)
130. Competitive Inhibition of Uracil DNA Glycosylase by a Modified Nucleotide Whose Triphosphate is a Substrate for DNA Polymerase.  
Huang, H.; Stivers, J. T.; Greenberg, M. M. *J. Am. Chem. Soc.* **2009**, *131*, 1344-1345. (PMCID: PMC2635492)
131. Scope and Mechanism of Interstrand Cross-link Formation by the C4'-Oxidized Abasic Site  
Szczepanski, J. T.; Jacobs, A. C.; Majumdar, A.; Greenberg, M. M. *J. Am. Chem. Soc.* **2009**, *131*, 11132-11139. (PMCID: PMC2635492) (Highlighted/summarized by Faculty of 1000 Biology (<http://www.f1000biology.com>)).
132. Photochemical Generation and Reactivity of the 5,6-Dihydrouridin-6-yl Radical.  
Newman, C. A.; Resendiz, M. J. E.; Szczepanski, J. T.; Greenberg, M. M. *J. Org. Chem.* **2009**, *74*, 7007-7012. (PMID: 19691299)
133. Double-Strand Break Formation During Nucleotide Excision Repair of a DNA Interstrand Cross-link.  
Szczepanski, J. T.; Jacobs, A. C.; Van Houten, B.; Greenberg, M. M. *Biochemistry* **2009**, *48*, 7565-7567. (PMCID: PMC2725361) (Highlighted (“Spotlight”) in *Chem. Res. Toxicol.* **2009**, *22*, 1651.)
134. The Mutagenicity of Thymidine Glycol in Escherichia Coli is Increased When it is Part of a Tandem Lesion.  
Huang, H.; Imoto, S.; Greenberg, M. M. *Biochemistry* **2009**, *48*, 7833-7841. (PMCID: PMC2728776)
135. DNA Interstrand Cross-link Formation by the 1,4-Dioxobutane Abasic Lesion.  
Guan, L.; Greenberg, M. M. *J. Am. Chem. Soc.* **2009**, *131*, 15225-15231. (PMCID: PMC2784881)
136. Nucleotide Excision Repair of a DNA Interstrand Cross-link Produces Single- and Double-Strand Breaks.  
Peng, X.; Ghosh, A. K.; Van Houten, B.; Greenberg, M. M. *Biochemistry* **2010**, *49*, 11-19. (PMCID: PMC2804059)
137. DNA Damage and Interstrand Cross-link Formation Upon Irradiation of Aryl Iodide C-Nucleotide Analogues.  
Ding, H.; Greenberg, M. M. *J. Org. Chem.* **2010**, *75*, 535-544. (PMCID: PMC2813935)

138. Excision of a Lyase Resistant Oxidized Abasic Lesion from DNA.  
Wong, R. S.; Sczepanski, J. T.; Greenberg, M. M. *Chem. Res. Toxicol.* **2010**, *23*, 766-770. (PMCID: PMC2863051)
139. Direct Strand Scission From a Nucleobase Radical in RNA.  
Jacobs, A. C.; Resendiz, M. J. E.; Greenberg, M. M. *J. Am. Chem. Soc.* **2010**, *132*, 3668-3669. (PMCID: PMC2845440) (Highlighted in *J. Am. Chem. Soc. Select* collection entitled: *Chemical Mechanisms in Biochemical Reactions*, edited by Professor Vern Schramm *J. Am. Chem. Soc.*, **2011**, *133*, 13207–13212.)
140. Irreversible Inhibition of DNA Polymerase  $\beta$  by an Oxidized Abasic Lesion.  
Guan, L.; Greenberg, M. M. *J. Am. Chem. Soc.* **2010**, *132*, 5004-5005. (PMCID: PMC2813935)
141. A Nucleic Acid-Directed, Red Light-Induced Chemical Reaction.  
Fülöp, A.; Xiaohua Peng, X.; Greenberg, M. M.; Mokhir, A. *Chem. Commun.* **2010**, *46*, 5659-5661. (PMID: 20574574)
142. Inhibition of Short Patch and Long Patch Base Excision Repair by an Oxidized Abasic Site.  
Guan, L.; Bebenek, K.; Kunkel, T. A.; Greenberg, M. M. *Biochemistry* **2010**, *49*, 9904-9910. (PMC: 2976803)
143. Rapid DNA-Protein Cross-linking and Strand Scission by an Abasic Site in a Nucleosome Core Particle.  
Sczepanski, J. T.; Wong, R. S.; McKnight, J. N.; Bowman, G. D.; Greenberg, M. M. *Proc. Natl. Acad. Sci. USA* **2010**, *107*, 22475-22480. (PMC: 3012510)
144. Long Patch Base Excision Repair Compensates for DNA Polymerase  $\beta$  Inactivation by the C4'-Oxidized Abasic Site.  
Jacobs, A. C.; Kreller, C. R.; Greenberg, M. M. *Biochemistry* **2011**, *50*, 136-143. (PMC: 3136615) (Second mostly widely accessed article in *Biochemistry* from January – December 2012.)
145. An Oxidized Abasic Lesion as an Intramolecular Source of DNA Adducts.  
Guan, L.; Greenberg, M. M. *Aust. J. Chem.* **2011**, *64*, 438-442. Invited article for Athelstan L. J. Beckwith memorial issue. (PMC: 4225716)
146. Product and Mechanistic Analysis of the Reactivity of a C6-Pyrimidine Radical in RNA.  
Jacobs, A. C.; Resendiz, M. J. E.; Greenberg, M. M. *J. Am. Chem. Soc.* **2011**, *133*, 5152-5159. (PMC: 3071645)
147. Repair of the Major Lesion Resulting from C5'-Oxidation of DNA.  
Jung, K. Y.; Kodama, T.; Greenberg, M. M. *Biochemistry* **2011**, *50*, 6273-6279. (PMC: 3136800)
148. Intracellular Detection of Cytosine Incorporation in Genomic DNA Using 5-Ethynyl-2'-Deoxycytidine.



- Guan, L.; van der Heijden, G.; Bortvin, A.; Greenberg, M. M. *ChemBioChem* **2011**, *12*, 2184-2190. Selected by the editor as a Very Important Paper. (PMC: 3341615)
149. Probing DNA Interstrand Cross-link Formation by an Oxidized Abasic Site Using Nonnative Nucleotides.  
 Szczepanski, J. T.; Hiemstra, C. N.; Greenberg, M. M. *Bioorganic & Med. Chem.* **2011**, *19*, 5788-5793. (PMC: 3177026)
150. Direct Strand Scission in Double Stranded RNA via a C5-Pyrimidine Radical.  
 Resendiz, M. J. E.; Pottiboyina, V.; Sevilla, M. D.; Greenberg, M. M. *J. Am. Chem. Soc.* **2012**, *134*, 3917-3924. (PMC: 3315363)
151. Histone Catalyzed Cleavage of Nucleosomal DNA Containing 2-Deoxyribonolactone.  
 Zhou, C.; Greenberg, M. M. *J. Am. Chem. Soc.* **2012**, *134*, 8090-8093. "Spotlighted" in the *J. Am. Chem. Soc.* **2012**, *134*, 9031. (PMC: 3354019)
152. DNA Damage by C1027 Involves Hydrogen Atom Abstraction and Addition to Nucleobases.  
 San Pedro, J. M. N.; Beerman, T. A.; Greenberg, M. M. *Bioorganic & Med. Chem.* **2012**, *20*, 4744-4750. (PMC: 3406177)
153. Quantification of 8-OxidGuo Lesions in Double-Stranded DNA Using a Photoelectrochemical DNA Sensor.  
 Zhang, B.; Guo, L.-H.; Greenberg, M. M. *Anal. Chem.* **2012**, *84*, 6048-6053. (PMC: 3872968)
154. Photochemical Generation of the Major Hydroxyl Radical Adduct of Thymidine.  
 San Pedro, J. M. N.; Greenberg, M. M. *Org. Lett.* **2012**, *14*, 2866-2869. (PMC: 3366351)
155. Photochemical Control of RNA Structure by Disrupting  $\pi$ -Stacking.  
 Resendiz, M. J. E.; Schön, A.; Freire, E.; Greenberg, M. M. *J. Am. Chem. Soc.* **2012**, *134*, 12478-12481. Highlighted by Faculty1000: <http://f1000.com/prime/718008044?subscriptioncode=698beb4c-fb8a-4a37-bb37-0f3e5fc23efb#related-articles> (PMC: 3416055)
156. Mechanistic Studies on Histone Catalyzed Cleavage of Apyrimidinic/Apurinic Sites in Nucleosome Core Particles.  
 Zhou, C.; Szczepanski, J. T.; Greenberg, M. M. *J. Am. Chem. Soc.* **2012**, *134*, 16734-16741. (PMC: 3477373)
157. Human DNA Polymerase  $\beta$ , But Not  $\lambda$ , Can Bypass a 2-Deoxyribonolactone Lesion Together With Proliferating Cell Nuclear Antigen.  
 Crespan, E.; Pasi, E.; Imoto, S.; Greenberg, M. M.; Hübscher, U.; Maga, G. *ACS Chem. Biol.* **2013**, *8*, 336-344. (PMC: 3574196)

158. Transforming Thymidine Into a Magnetic Resonance Imaging Probe for Monitoring Gene Expression.  
Bar-Shir, A.; Liu, G.; Liang, Y.; Yadav, N. N.; McMahon, M. T.; Walczak, P.; Nimmagadda, S.; Pomper, M. G.; Tallman, K. A.; Greenberg, M. M.; van Zijl, P. C. M.; Bulte, J. W. M.; Gilad, A. A. *J. Am. Chem. Soc.* **2013**, *135*, 1617-1624. (PMC: 3560322)
159. DNA Polymerase  $\lambda$  Inactivation by Oxidized Abasic Sites.  
Stevens, A. J.; Guan, L.; Bebenek, K.; Kunkel, T. A.; Greenberg, M. M. *Biochemistry* **2013**, *52*, 975-983. (PMC: 3566640)
160. Nucleosome Core Particle Catalyzed Strand Scission at Abasic Sites.  
Sczepanski, J. T.; Zhou, C.; Greenberg, M. M. *Biochemistry* **2013**, *52*, 2157-2164. (PMC: 3718853)
161. Histone Modification via Rapid Cleavage of C4'-Oxidized Abasic Sites in Nucleosome Core Particles.  
Zhou, C.; Sczepanski, J. T.; Greenberg, M. M. *J. Am. Chem. Soc.* **2013**, *135*, 5274-5277. "Spotlighted" in the *J. Am. Chem. Soc.* **2013**, *135*, 5933. (PMC: 3638250)
162. Deconvoluting the Reactivity of Two Intermediates Formed From Modified Pyrimidines.  
Weng, L.; Horvat, S. M.; Schiesser, C. S.; Greenberg, M. M. *Org. Lett.* **2013**, *15*, 3618-3621. (PMC: 3830933)
163. Photochemical Control of DNA Structure via Radical Disproportionation.  
San Pedro, J. M. N.; Greenberg, M. M. *ChemBioChem* **2013**, *14*, 1590-1596.  
Cited by Faculty1000: <http://f1000.com/prime/718072208?bd=1&ui=21843>. (PMC: 3807129)
164. Synthesis of a Reporter Probe for Monitoring HSV1-Tk Reporter Gene Expression Using Chemical Exchange Saturation Transfer (CEST) MRI.  
Bar-Shir, A.; Liu, G.; Greenberg, M. M.; Bulte, J. W. M.; Gilad, A. A. *Nature Protocols* **2013**, *8*, 2380-2391. (PMC: 3870049)
165. DNA Polymerase V Kinetics Support the Instructive Nature of an Oxidized Abasic Lesion in *E. coli*.  
Bajacan, J. V. E.; Greenberg, M. M. *Biochemistry* **2013**, *52*, 6301-6303. (PMC: 3817503)
166. DNA Double Strand Cleavage via Interstrand Hydrogen Atom Transfer.  
Taverna Porro, M. L.; Greenberg, M. M. *J. Am. Chem. Soc.* **2013**, *135*, 16368-16371. "Spotlighted" in the *J. Am. Chem. Soc.* **2013**, *135*, 16745. Cited by Faculty1000: <http://f1000.com/prime/718152314?bd=1&ui=21843>. (PMC: 3852885)
167. Reduced Repair Capacity of a DNA Clustered Damage Site Comprised of 8-Oxo-7,8-dihydroguanine and 2-Deoxyribonolactone Results in an Increased Mutagenic Potential of These Lesions.  
Cunniffe, S.; Smirnova, E.; O'Neill, P.; Greenberg, M. M.; Lomax, M. E. *Mutat. Res.:*

- Fundam. Mol. Mech. Mutagen.* **2014**, 762, 32-39. (PMC: 3990186)
168. Irreversible Inhibition of DNA Polymerase  $\beta$  by Small Molecule Mimics of a DNA Lesion. Arian, D.; Hedayati, M.; Zhou, H.; Bilis, Z.; Chen, K.; DeWeese, T. L.; Greenberg, M. M. *J. Am. Chem. Soc.* **2014**, 136, 3176-3183. (PMC: 4047187)
169. 5,6-Dihydropyrimidine Peroxyl Radical Reactivity in DNA. San Pedro, J. M. N.; Greenberg, M. M. *J. Am. Chem. Soc.* **2014**, 136, 3928-3936. (PMC: 3980663)
170. DNA Interstrand Cross-Linking Upon Irradiation of Aryl Halide C-Nucleotides. Hou, D.; Greenberg, M. M. *J. Org. Chem.* **2014**, 79, 1877-1884. Designated by the Journal as a Feature Article. Selected by the American Chemical Society as an ACS Editors' Choice paper. "ACS Editors' Choice is a new initiative wherein, based on recommendations from Editors, one article from across the portfolio is selected each day of the year and upon publication is made immediately available as open access sponsored by ACS Publications." (PMC: 3982193)
171. DNA Damage by Histone Radicals in Nucleosome Core Particles. Zhou, C.; Greenberg, M. M. *J. Am. Chem. Soc.* **2014**, 136, 6562-6565. (PMC: 4017609)
172. Quantitative Detection of 8-Oxo-7,8-dihydro-2'-deoxyguanosine Using Chemical Tagging and qPCR. Bajacan, J. V. E.; Hong, I. S.; Penning, T. M.; Greenberg, M. M. *Chem. Res. Toxicol.* **2014**, 27, 1227-1235. (PMC: 4106692)
173. Synthesis of Cross-linked DNA Containing Oxidized Abasic Site Analogues. Ghosh, S.; Greenberg, M. M. *J. Org. Chem.* **2014**, 79, 5948-5957. Designated by the Journal as a Feature Article. (PMC: 4084848)
174. Nucleotide Excision Repair of Chemically Stabilized Analogues of DNA Interstrand Cross-links Produced From Oxidized Abasic Sites. Ghosh, S.; Greenberg, M. M. *Biochemistry* **2014**, 53, 5958-5965. (PMC: 4172206)
175. Interstrand Cross-Link and Bioconjugate Formation in RNA From a Modified Nucleotide. Sloane, J. L.; Greenberg, M. M. *J. Org. Chem.* **2014**, 79, 9792-9798. (PMC: 4201359)
176. Independent Generation and Reactivity of the Uridin-2'-yl Radical. Paul, R.; Greenberg, M. M. *J. Org. Chem.* **2014**, 79, 10303-10310. (PMC: 4227586)
177. Rapid RNA Strand Scission Following C2'-Hydrogen Atom Abstraction. Paul, R.; Greenberg, M. M. *J. Am. Chem. Soc.* **2015**, 137, 596-599. (PMC: 4313564)
178. Probing Interactions Between Histone Tails and Nucleosomal DNA via Product and Kinetic Analysis.

- Weng, L.; Zhou, C.; Greenberg, M. M. *ACS Chem. Biol.* **2015**, *10*, 622-630. "Spotlighted" in *Chem. Res. Toxicol.* **2015**, *28*, 3. (PMC: 4336632)
179. Double Strand Breaks From a Radical Commonly Produced by DNA Damaging Agents.  
Taverna Porro, M. L.; Greenberg, M. M. *Chem. Res. Toxicol.* **2015**, *28*, 810-816. (PMC: 4415041) Selected by the American Chemical Society as an ACS Editors' Choice paper. "ACS Editors' Choice is an initiative wherein, based on recommendations from Editors, one article from across the portfolio is selected each day of the year and upon publication is made immediately available as open access sponsored by ACS Publications." The manuscript was also highlighted on the journal cover. The manuscript was also included in the 2015 "Editorial Advisory Board Members' Favorite CRT Articles" of *Chem. Res. Toxicol.* (<http://pubs.acs.org/page/crtoec/vi/eab-favorites.html>)
180. Unlike Catalyzing Error-Free Bypass of 8-OxodGuo, DNA Polymerase  $\lambda$  Is Responsible for a Significant Part of Fapy•dG-Induced G→T Mutations in Human Cells.  
Pande, P.; Haraguchi, K.; Jiang, Y.-L.; Greenberg, M. M.; Basu, A. K. *Biochemistry* **2015**, *54*, 1859-1862. (PMC: 4630799)
181. Light-Triggered RNA Annealing by an RNA Chaperone.  
Panja, S.; Paul, R.; Greenberg, M. M.; Woodson, S. A. *Angew. Chem. Int. Ed.* **2015**, *54*, 7281-7284. (PMC: 4478220)
182. Sequence Selective Tagging of 8-Oxo-7,8-dihydro-2'-deoxyguanosine (8-oxodGuo) Using PNAs.  
Hong, I. S.; Greenberg *Bioorg. & Med. Chem. Lett.* **2015**, *25*, 4918-4921. Invited submission for a special Symposium-in-Print issue entitled "Recent Advances in Medicinal Chemistry and Chemical Biology" to commemorate 25 years since *Bioorg. & Med. Chem. Lett.* began publishing.
183. Rapid Histone Catalyzed DNA Lesion Excision and Accompanying Protein Modification in Nucleosomes and Nucleosome Core Particles.  
Weng, L.; Greenberg, M. M. *J. Am. Chem. Soc.* **2015**, *137*, 11022-11031. (PMC: 4612368)
184. Correlation of Thermal Stability and Structural Distortion of DNA Interstrand Cross-links Produced From Oxidized Abasic Sites Explain Their Selective Formation and Repair.  
Ghosh, S.; Greenberg, M. M. *Biochemistry* **2015**, *54*, 6274-6283. (PMC: 4623589)
185. Bromopyridone Nucleotide Analogues, Anoxic Selective Radiosensitizing Agents that are Incorporated in DNA by Polymerases.  
Rudra, A.; Hou, D.; Zhang, Y.; Coulter, J.; Zhao, H.; DeWeese, T. L.; Greenberg, M. M. *J. Org. Chem.* **2015**, *80*, 10675-10685. (PMC: 4877698)
186. Mutagenic Bypass of an Oxidized Abasic Lesion-Induced DNA Interstrand Cross-link Analogue by Human Translesion Synthesis DNA Polymerases.  
Xu, W.; Ouellette, A.; Ghosh, S.; O'Neill, T. C.; Greenberg, M. M.; Zhao, L. *Biochemistry* **2015**, *54*, 7409-7422. (PMC: 4700817)

187. Mechanistic Studies on RNA Strand Scission From a C2'-Radical.  
Paul, R.; Greenberg, M. M. *J. Org. Chem.* **2016**, *81*, 9199-9205. (PMC: 5055465)
188. Structural Basis for Excision of 5-Formylcytosine by Thymine DNA Glycosylase.  
Pidugu, L. S.; Flowers, J.; Coey, C. T.; Pozharski, E.; Greenberg, M. M.; Drohat, A. C. *Biochemistry* **2016**, *53*, 6205-6208. (PMC: 5148694)
189. Probing Enhanced Double Strand Break Formation at Abasic Sites Within Clustered Lesions in Nucleosome Core Particles.  
Banerjee, S.; Chakraborty, S.; Jacinto, M. P.; Paul, M. D.; Balster, M. V.; Greenberg, M. M. *Biochemistry* **2017**, *54*, 14-21. (PMC: 5372979)
190. Identification of Proximal Sites for Partially Unwound DNA Substrate in *Escherichia coli* Topoisomerase I With Oxidative Crosslinking.  
Cheng, B.; Zhou, Q.; Weng, L.; Leszyk, J. D.; Greenberg, M. M.; Tse-Dinh, Y. *FEBS Lett.* **2017**, *591*, 28-38. (PMC: 5235945)
191. Aminyl Radical Generation via Tandem Norrish Type I Photocleavage,  $\beta$ -Fragmentation: Independent Generation and Reactivity of the 2'-Deoxyadenosin-N6-yl Radical.  
Zheng, L.; Griesser, M.; Pratt, D. A.; Greenberg, M. M. *J. Org. Chem.* **2017**, *82*, 3571-3580. (PMC: 5494259)
192. Thiol Specific and Tracelessly Removable Bioconjugation via Michael Addition to 5-Methylene Pyrrolones.  
Zhang, Y.; Zhou, X.; Xie, Y.; Greenberg, M. M.; Xi, Z.; Zhou, C. *J. Am. Chem. Soc.* **2017**, *139*, 6146-6151. (PMC: 5491101)
193. EC-Tagging Allows Cell Type-Specific RNA Analysis.  
Hida, N.; Aboukilila, M. Y.; Burow, D. A.; Paul, R.; Greenberg, M. M.; Fazio, M.; Beasley, S.; Spitale, R. C.; Cleary, M. D. *Nucleic Acids Res.* **2017**, *45*, e138. (PMC: 5587779)
194. The A-Rule and Deletion Formation During Abasic and Oxidized Abasic Site Bypass by DNA Polymerase  $\theta$ .  
Lavery, D. J.; Averill, A. M.; Doublié, S.; Greenberg, M. M. *ACS Chem. Biol.* **2017**, *12*, 1584-1592. (PMC: 5499511)
195. Synergistic Effects of an Irreversible DNA Polymerase Inhibitor and DNA Damaging Agents on HeLa Cells.  
Paul, R.; Banerjee, S.; Greenberg, M. M. *ACS Chem. Biol.* **2017**, *12*, 1576-1583. Correction: *ACS Chem. Biol.* **2018**, *13*, 832-832. (PMC: 5492961) (Highlighted ("Spotlight") in *Chem. Res. Toxicol.* **2017**, *30*, 1367-1368.)
196. 5-Formylcytosine Yields DNA-Protein Crosslinks in Nucleosome Core Particles.  
Li, F.; Zhang, Y.; Bai, J.; Greenberg, M. M.; Xi, Z.; Zhou, C. *J. Am. Chem. Soc.* **2017**, *139*, 10617-10620. (PMC: 5649621)

197. Independent Generation and Reactivity of Thymidine Radical Cations.  
Sun, H.; Taverna Porro, M. L.; Greenberg, M. M. *J. Org. Chem.* **2017**, *82*, 11072-11083. (PMC: 5653312)
198. DNA Damage Emanating From a Neutral Purine Radical Reveals the Sequence Dependent Convergence of the Direct and Indirect Effects of  $\gamma$ -Radiolysis.  
Zheng, L.; Greenberg, M. M. *J. Am. Chem. Soc.* **2017**, *139*, 17751-17754. (PMC: 5729073)
199. Independent Photochemical Generation and Reactivity of Nitrogen-Centered Purine Nucleoside Radicals From Hydrazines.  
Zheng, L.; Lin, L.; Qu, K.; Adhikary, A.; Sevilla, M. D.; Greenberg, M. M. *Org. Lett.* **2017**, *19*, 6444-6447. (PMC: 5711525)
200. In Vitro Pol Theta Bypass of Thymidine Glycol Forms Sequence-Dependent Frameshift Mutations.  
Lavery, D. J.; Greenberg, M. M. *Biochemistry* **2017**, *56*, 6726-6733. (PMC: 5743609)
201. An Oxidized Abasic Lesion Inhibits Base Excision Repair Leading to DNA Strand Breaks in a Trinucleotide Repeat Tract.  
Beaver, J. M.; Lai, Y.; Rolle, S. J.; Weng, L.; Greenberg, M. M.; Liu, Y. *PLoS ONE* **13**(2): e0192148. <https://doi.org/10.1371/journal.pone.0192148> (PMC: 5794147)
202. Traceless Tandem Lesion Formation in DNA From a Nitrogen-Centered Purine Radical.  
Zheng, L.; Greenberg, M. M. *J. Am. Chem. Soc.* **2018**, *140*, 6400-6407. (PMC: 5966344)
203. Mechanistic Insight Through Irreversible Inhibition: DNA Polymerase  $\theta$  Uses a Common Active Site for Polymerase and Lyase Activities.  
Lavery, D. J.; Mortimer, I. P.; Greenberg, M. M. *J. Am. Chem. Soc.* **2018**, *140*, 9034-9037. (PMC: 6085753)
204. Rotational Effects Within Nucleosome Core Particles on Abasic Site Reactivity.  
Wang, R.; Yang, K.; Banerjee, S.; Greenberg, M. M. *Biochemistry* **2018**, *57*, 3945-3952. (PMC: 6030455)
205. Independent Generation of Reactive Intermediates Leads to an Alternative Mechanism for Strand Damage Induced by Hole Transfer in Poly•(dA-T) Sequences.  
Sun, H.; Zheng, L.; Greenberg, M. M. *J. Am. Chem. Soc.* **2018**, *140*, 11308-11316. (PMC: 6135700)
206. Enhanced Cleavage at Abasic Sites Within Clustered Lesions in Nucleosome Core Particles.  
Yang, K.; Greenberg, M. M. *ChemBioChem* **2018**, *19*, 2061-2065. (PMC: 6172155)  
Designated as a Very Important Paper (VIP) by the Editor.
207. Facile Synthesis of 5-Methylene-2-pyrrolones.

- Jacinto, M. P.; Pichling, P.; Greenberg, M. M. *Org. Lett.* **2018**, *20*, 4885-4887. (PMC: 6132240)
208. Expanded Substrate Scope of DNA Polymerase Theta and DNA Polymerase Beta: Lyase Activity on 5'-Overhangs and Clustered Lesions.  
Lavery, D. J.; Greenberg, M. M. *Biochemistry* **2018**, *57*, 6119-6127. (PMC: 6200648)
209. Oxidation of 8-Oxo-7,8-dihydro-2'-deoxyguanosine Leads to Substantial DNA-Histone Cross-links Within Nucleosome Core Particles.  
Bai, J.; Zhang, Y.; Xi, Z.; Greenberg, M. M.; Zhou, C. *Chem. Res. Toxicol.* **2018**, *31*, 1364-1372. (PMC: 6425731)
210. Histone Tails Decrease N7-Methyl-2'-Deoxyguanosine Depurination and Yield DNA-Protein Crosslinks in Nucleosome Core Particles and Cells.  
Yang, K.; Park, D.; Tretyakova, N. Y.; Greenberg, M. M. *Proc. Natl. Acad. Sci. USA* **2018**, *115*, E11212-E11220. Highlighted in *Chemical & Engineering News* (<https://cen.acs.org/biological-chemistry/nucleic-acids/Chemicals-cause-unexpected-DNA-damage/96/i48>). Highlighted in NIEHS Environmental factor, papers of the month of February: ([https://factor.niehs.nih.gov/2019/2/papers/dert/index.htm?utm\\_source=efactor-newsletter&utm\\_medium=email&utm\\_campaign=efactor-newsletter-2019-February#a3](https://factor.niehs.nih.gov/2019/2/papers/dert/index.htm?utm_source=efactor-newsletter&utm_medium=email&utm_campaign=efactor-newsletter-2019-February#a3)). (PMC: 6275548)
211. Histone Tail Sequences Balance Their Role in Genetic Regulation and the Need to Protect DNA Against Destruction in Nucleosome Core Particles Containing Abasic Sites.  
Yang, K.; Greenberg, M. M. *ChemBioChem* **2019**, *20*, 78-82. (PMC: 6317330)
212. A Guardian Residue Hinders Insertion of a Fapy•dGTP Analog by Modulating the Open-Closed DNA Polymerase Transition.  
Smith, M. R.; Shock, D. D.; Beard, W. A.; Greenberg, M. M.; Freudenthal, B. D.; Wilson, S. H. *Nucleic Acids Res.* **2019**, *47*, 3197-3207. (PMC: 6451102)
213. Reactivity of the Major C5'-Oxidative DNA Damage Product in Nucleosome Core Particles.  
Rana, A.; Yang, K.; Greenberg, M. M. *ChemBioChem* **2019**, *20*, 672-676. Designated as a Very Important Paper (VIP) by the Editor. (PMC: 6397081)
214. Effect of Histone Lysine Methylation on DNA Lesion Reactivity in Nucleosome Core Particles.  
Yang, K.; Prasse, C.; Greenberg, M. M. *Chem. Res. Toxicol.* **2019**, *32*, 910-916. Invited article for special issue: Epigenetics in Toxicology. (PMC: 6533150)
215. Positional Dependence of DNA Hole Transfer Efficiency in Nucleosome Core Particles.  
Sun, H.; Zheng, L.; Yang, K.; Greenberg, M. M. *J. Am. Chem. Soc.* **2019**, *141*, 10154-10158. (PMC: 6610759)
216. Reactivity of 3-Methyl-2'-Deoxyadenosine in Nucleosome Core Particles.

- Yang, K.; Sun, H.; Lowder, L.; Varadarajan, S.; Greenberg, M. M. *Chem. Res. Toxicol.* **2019**, *32*, 2118-2124. Selected to be Editor's Choice by the American Chemical Society; September 30, 2019. (PMC: 6803048)
217. DNA-Protein Cross-link Formation in Nucleosome Core Particles Treated with Methyl Methanesulfonate.  
Yang, K.; Greenberg, M. M. *Chem. Res. Toxicol.* **2019**, *32*, 2144-2151. (PMC: 6803050)
218. Mutagenic Effects of a 2-Deoxyribonolactone – Thymine Glycol Tandem Lesion in Human Cells.  
Naldiga, S.; Huang, H.; Greenberg, M. M.; Basu, A. K. *Biochemistry* **2020**, *59*, 417-424. (PMC: 7003646)
219. Solid-Phase Synthesis of Oligonucleotides Containing the  $N^6$ -(2-Deoxy- $\alpha,\beta$ -D-erythropentofuranosyl)-2,6-diamino-4-hydroxy-5-formamidopyrimidine (Fapy•dG) Oxidative Damage Product Derived from 2'-Deoxyguanosine.  
Yang, H.; Tang, J. A.; Greenberg, M. M. *Chem. – Eur. J.* **2020**, *26*, 5441 – 5448. Designated by the editor as a *Hot Paper*. (PMC: 7309192)
220. Light-Controlled Twister Ribozyme With Single Molecule Detection Resolves RNA Function in Time and Space.  
Korman, A.; Sun, H.; Hua, B.; Yang, H.; Capilato, J. N.; Paul, R.; Panja, S.; Ha, T.; Greenberg, M. M.; Woodson, S. A. *Proc. Natl. Acad. Sci. USA* **2020**, *117*, 12080-12086. (PMC: 7275738)
221. Independent Generation and Time-Resolved Detection of 2'-Deoxyguanosin- $N2$ -yl Radicals.  
Zheng, L.; Dai, X.; Su, H.; Greenberg, M. M. *Angew. Chem. Int. Ed.* **2020**, *59*, 13406-13413. Designated by the editor as a *Hot Paper*. (PMC: 7395871)
222. Independent Generation and Reactivity of 2'-Deoxyguanosin- $N1$ -yl Radical.  
Zheng, L.; Greenberg, M. M. *J. Org. Chem.* **2020**, *85*, 8665-8672. (PMC: 7334105)
223. Identifying Poly(ADP-ribose)-Binding Proteins With Photoaffinity-Based Proteomics.  
Dasovich, M.; Beckett, M. Q.; Bailey, S.; Ong, S.; Greenberg, M. M.; Leung, A. K. L. *J. Am. Chem. Soc.* **2021**, *143*, 3037-3042.
224. Selective Inhibition of DNA Polymerase  $\beta$  by a Covalent Inhibitor.  
Yuhas, S. C.; Laverty, D. J.; Lee, H.; Greenberg, M. M. *J. Am. Chem. Soc.* **2021**, *143*, 8099-8107.
225. Sequence Context Effects of Replication of Fapy•dG in Three Mutational Hot Spot Sequences of the p53 Gene in Human Cells.  
Bacurio, J. H.; Yang, H.; Naldiga, S.; Powell, B. V.; Ryan, B. J.; Freudenthal, B. D.; Greenberg, M. M. Basu, A. K. (submitted).



226. Protein Domain Specific Covalent Inhibition of Human DNA Polymerase  $\beta$ .  
 Yuhas, S. C.; Majumdar, A.; Greenberg, M. M. *ChemBioChem*  
<http://dx.doi.org/10.1002/cbic.202100247>
227. Suppression of DNA Polymerase  $\beta$  Activity is Synthetically Lethal in BRCA1-Deficient Cells.  
 Yuhas, S. C.; Mishra, A.; DeWeese, T. L.; Greenberg, M. M. *ACS Chem. Biol.*  
<https://pubs.acs.org/doi/10.1021/acscchembio.1c00385>
228. Reactivity and DNA Damage by Independently Generated 2'-Deoxycytidin-N4-yl Radical.  
 Peng, H.; Jialong, J.; Mortimer, I. P.; Zehan, M.; Su, H.; Greenberg, M. M. (submitted).

### Invited Reviews and Book Chapters

- The Chemistry of DNA Damage  
 Greenberg, M. M. in *Comprehensive Natural Products Chemistry, Vol. VII, DNA and Aspects of Molecular Biology*; Editor: E. T. Kool; Pergammon Press, Oxford, 1999, pp. 371-426.
- Attachment of Reporter and Conjugate Groups to the 3'-Termini of Oligonucleotides.  
 Greenberg, M. M. in *Current Protocols in Nucleic Acid Chemistry, Supplement 2*, Editors: Beaucage, S. L.; Bergstrom, D.; Glick, G.; Jones, R.; John Wiley & Sons, New York, 2000. (PMID: 18428852)
- Investigating Nucleic Acid Damage Processes Via Independent Generation of Reactive Intermediates.  
 Greenberg, M. M. *Chem. Res. Toxicol.* **1998**, *11*, 1235.
- In Vitro and In Vivo Effects of Oxidative Damage to Deoxyguanosine.  
 Greenberg, M. M. *Biochemical Society Transactions* **2004**, *32*, 46.
- Elucidating DNA Damage and Repair Processes by Independently Generating Reactive and Metastable Intermediates.  
 Greenberg, M. M. *Org. & Biomol. Chem.* **2007**, *5*, 18-27. (PMID: 17164902)
- Pyrimidine Nucleobase Radical Reactivity.  
 Greenberg, M. M. In *Reactive Intermediates in Chemistry and Biology: Radical and Radical Ion Reactivity in Nucleic Acid Chemistry*. Greenberg, M. M., Editor; John Wiley & Sons, Hoboken, 2009.
- The Formamidopyrimidines: Purine Lesions Formed in Competition With 8-Oxopurines From Oxidative Stress.  
 Greenberg, M. M. *Acc. Chem. Res.* **2012**, *45*, 588-597. (PMC: 3292677)
- Biologically Relevant Oxidants and Terminology, Classification and Nomenclature of Oxidatively Generated Damage to Nucleobases and 2-Deoxyribose in Nucleic Acids.  
 Cadet, J.; Loft, S.; Olinski, R.; Evans, M. D.; Bialkowski, K.; Wagner, J. R.; Dedon, P. C.; Moller, P.; Greenberg, M. M.; Cooke, M. S. *Free Rad. Res.* **2012**, *46*, 367-381. (PMC: 3864884)

9. Abasic and Oxidized Abasic Site Reactivity in DNA: Enzyme Inhibition, Cross-linking, and Nucleosome Catalyzed Reactions.  
Greenberg, M. M. *Acc. Chem. Res.* **2014**, *47*, 646-655. (PMC: 3944396)
10. Looking Beneath the Surface to Determine What Makes DNA Damage Deleterious.  
Greenberg, M. M. *Current Opinion in Chemical Biology* **2014**, *21*, 48-55. (PMC: 4149920)
11. Reactivity of Nucleic Acid Radicals.  
Greenberg, M. M. *Advances in Physical Organic Chemistry* **2016**, *50*, 119-202. (PMC: 5435387)
12. Pyrimidine Nucleobase Radical Reactivity in DNA and RNA.  
Greenberg, M. M. *Radiation Physics and Chemistry* **2016**, *128*, 82-91. (PMC: 5087805)
13. Tandem and Clustered Lesions from Radicals in Nucleic Acids from a Single Initial Chemical Event.  
Greenberg, M. M. In *DNA Damage, Repair and Disease: Volume 1*, Editors: Dizdaroglu, M. and Lloyd, R. S.; Royal Society of Chemistry, **2021**, pp. 27-60.

#### Books Edited

1. *Reactive Intermediates in Chemistry and Biology: Radical and Radical Ion Reactivity in Nucleic Acid Chemistry*. John Wiley & Sons, Hoboken, 2009.

#### Patents

1. Novel Selenyl-Methyluracil Compounds, Radiosensitizer and Pharmaceutical Composition Using Them.  
Hong, In Seok; Hong, Sung Hee; Greenberg, Marc M.; PCT Int. App. (212), WO 2012050264 A1 20120419.
2. Irreversible Inhibitors of DNA Polymerase Beta.  
Greenberg, Marc. M.; Arian, Dumitru; DeWeese, Theodore L.; Hedayati, Mohammad; U.S. (2015), US 9029346 B1 20150512.

#### Nonrefereed Manuscripts

1. Synthesis and Characterization of Oligonucleotides Containing Formamidopyrimidine Lesions (Fapy•dA, Fapy•dG) at Defined Sites.  
Haraguchi, K.; Delaney, M. O.; Wiederholt, C. J.; Sambandam, A.; Hantosi, Z.; Greenberg, M. M. *Nucleic Acids Research Supplement No. 1* **2001**, 129.
2. DNA Interstrand Cross-Links From Modified Nucleotides: Mechanism and Application.  
Greenberg, M. M. *Nucleic Acids Research Symposium Series No. 49* **2005**, 57.
3. Mechanistic Studies and Applications of DNA Damage Using Nucleotide Probes.  
Greenberg, M. M. *Collection Symposium Series: Chemistry of Nucleic Acid Components* **2008**, *10*, 17-24.
4. Recommendations for Standardized Description of and Nomenclature Concerning Oxidatively

Damaged Nucleobases in DNA.

Cooke, M. S.; Loft, S.; Olinski, R.; Evans, M. D.; Bialkowski, K.; Wagner, J. R.; Dedon, P. C.; Møller, P.; Greenberg, M. M.; Cadet, J. *Chem. Res. Toxicol.* **2010**, *23*, 705-707. (PMID: 20235554)

5. Jerome A. Berson 1924-2017; Biographical Memoirs; National Academy of Sciences; 2021. Bergman, R.; Greenberg, M. <http://www.nasonline.org/publications/biographical-memoirs/memoir-pdfs/berson-jerome.pdf>

### **Plenary and Award Lectures:**

28<sup>th</sup> Annual Nucleic Acids Symposium; Yokohama, Japan; November 7-9, 2001.

5<sup>th</sup> Cambridge Symposium Nucleic Acids Chemistry and Biology; Cambridge, England; August 31 – September 3, 2003.

Lubomir S. Hnilica Memorial Lecture; Department of Biochemistry; Vanderbilt University School of Medicine; Nashville, TN; June 9, 2005.

4<sup>th</sup> International Symposium on Nucleic Acids Chemistry; Fukuoka, Japan; September 20-22, 2005.

14<sup>th</sup> Symposium on Chemistry of Nucleic Acid Components; Cesky Krumlov; Czech Republic; June 8-12, 2008.

Keynote Speaker, Chemistry-Biology Interface Program Symposium; Ohio State University; Columbus, OH; April 7-8, 2009.

Dean's Speakers Series in Chemical Biology; SUNY Binghamton; Binghamton, NY; April 12, 2013

Keynote Speaker: 16<sup>th</sup> International Congress of Radiation Research (ICRR); Manchester, England; August 25-29, 2019.

Keynote Speaker: 7<sup>th</sup> Elemental Organic Chemistry Symposium; Tianjin, China; July 10-11, 2021.

### **Invited Presentations:**

Department of Chemistry, Adams State College; Alamosa, CO; January 21, 1992.

Physical Organic Chemistry Gordon Research Conference; Plymouth, NH; June 1993. (short talk)

National Science Foundation Workshop in Organic Synthesis and Natural Product Chemistry; Flat Rock, NC; July 13-17, 1994.

Merck Research Laboratories; Rahway, NJ; October 11, 1994.

Ciba Geigy; Pharmaceuticals Division; Summit, NJ; October 12, 1994.

Department of Chemistry, State University of New York at Stonybrook; Stonybrook, NY; October 13, 1994.

Jerome A. Berson Symposium, Yale University; New Haven, CT; October 14, 1994.

Department of Chemistry, Syracuse University; Syracuse, NY; November 3, 1994.

Department of Chemistry, University of Rochester; Rochester, NY; November 4, 1994.

Department of Chemistry, University of Colorado at Boulder; Boulder, CO; November 28, 1994.

Department of Chemistry, University of Wyoming; Laramie, WY; December 2, 1994.

Department of Chemistry, University of Missouri-Columbia; Columbia, MO; December 7, 1994.

Department of Chemistry, University of Kansas; Lawrence, KS; December 8, 1994.

Department of Chemistry, Florida State University; Tallahassee, FL; March 6, 1995.

Department of Chemistry, Furman University; Greenville, SC; March 7, 1995.

Department of Chemistry, Emory University; Atlanta, GA; March 8, 1995.

Department of Chemistry, Georgia Institute of Technology; Atlanta, GA; March 9, 1995.  
Department of Chemistry, University of Florida; Gainesville, FL; March, 10, 1995.  
Department of Chemistry, Ohio State University; Columbus, OH; March 16, 1995.  
Department of Chemistry, University of Pittsburgh; Pittsburgh, PA; March 17, 1995.  
Department of Chemistry, Wayne State University; Detroit, MI; March 27, 1995.  
Parke-Davis Pharmaceuticals; Ann Arbor, MI; March 28, 1995.  
Department of Chemistry, Michigan State University; East Lansing, MI; March 29, 1995.  
Scripps Research Institute; La Jolla, CA; March 31, 1995.  
Department of Chemistry, University of California at San Diego; San Diego, CA; April 10, 1995.  
Department of Chemistry, University of California at Irvine; Irvine, CA; April 12, 1995.  
Department of Chemistry, University of California at Los Angeles; Los Angeles, CA; April 13, 1995.  
Department of Chemistry, Utah State; Logan, UT; May 24, 1995.  
Department of Chemistry, University of Utah; Salt Lake City, UT; May 25, 1995.  
Northwest and Rocky Mountain Region American Chemical Society; Symposium on Reactive Intermediates; Park City, UT; June 14-17, 1995.  
Colorado Center for RNA Chemistry Minisymposium; University of Colorado at Boulder; Boulder, CO; June 20, 1995.  
National Science Foundation Workshop on Reactive Intermediates; Tahoe, CA; August 19-23, 1995.  
Department of Chemistry, University of California at Berkeley; Berkeley, CA; April 23, 1996.  
Department of Chemistry, Stanford University; Palo Alto, CA; April 24, 1996.  
Department of Chemistry, Santa Clara University; Santa Clara, CA; April 25, 1996.  
Department of Chemistry, Louisiana State University; Baton Rouge, LA; October 31, 1996.  
Beckman Research Institute of the City of Hope; Duarte, CA; November 18, 1996.  
Free Radical Reactions Gordon Research Conference; Holderness School, NH; July 13-18, 1997.  
Department of Chemistry, Vanderbilt University; Nashville, TN; August 19-20, 1997.  
Colorado RNA Minisymposium; Boulder, CO; September 23, 1997.  
BioStar Inc.; Boulder, CO; October 27, 1997.  
Symposium on Reactive Intermediates; Fifth Chemical Congress of North America; Cancun, Mexico; November 11-15, 1997.  
Department of Chemistry, Texas Tech University; Lubbock, TX; January 28, 1998.  
Department of Chemistry, Cornell University; Ithaca, NY; February 16, 1998.  
Department of Chemistry, Mississippi State University; Hattiesburg, MS; February 26, 1998.  
Department of Chemistry, University of Alabama; Tuscaloosa, AL; February 27, 1998.  
Department of Chemistry, Texas A & M University; College Station, TX; April 23, 1998.  
Department of Chemistry, University of Denver; Denver, CO; November 5, 1998.  
Boston University (Department Colloquium); Boston, MA; November 9, 1998.  
University of Pittsburgh (Department Colloquium); Pittsburgh, PA; November 16, 1998.  
University of Chicago (Department Colloquium); Chicago, IL; November 23, 1998.  
Department of Chemistry, University of Illinois at Chicago; Chicago, IL; January, 19, 1999.  
University of Missouri-Columbia (Department Colloquium); Columbia, MO; February 5, 1999.  
Department of Chemistry, Rice University; Houston, TX; April 12, 1999.  
Department of Chemistry, University of Houston; Houston, TX; April 13, 1999.  
Department of Chemistry, University of Pennsylvania; Philadelphia, PA; May 14, 1999.  
Dupont Central Research and Development; Wilmington, DE; May 20, 1999.  
Twelfth Annual Colorado Biotechnology Symposium; Boulder, CO; September 14, 1999.

2000 Annual Meeting of the Radiation Research Society; Albuquerque, NM; April 29-May 3, 2000.  
Reaction Mechanisms Conference; Madison, WI; June 24-29, 2000.  
Thirteenth Annual Colorado Biotechnology Symposium; Ft. Collins, CO; September 14, 2000.  
Department of Chemistry, University of Maryland; College Park, MD; November 9, 2000.  
Department of Chemistry, New York University (Department Colloquium); New York, NY; November 17, 2000.  
Miller Conference on Radiation Chemistry; Windermere, England; April 7-12, 2001.  
Department of Chemistry, Johns Hopkins University; Baltimore, MD; June 5, 2001.  
Chemical Mechanisms of Oxidative DNA Damage and Repair; 222nd National Meeting of the American Chemical Society; Chicago, Illinois; August 29<sup>th</sup>, 2001  
VII<sup>th</sup> International Workshop Radiation Damage to DNA; Orléans-Nouan le Fuzelier, France; September 2-7, 2001.  
Tokyo Medical and Dental University; Tokyo, Japan; November 5, 2001.  
Nagoya University; Nagoya, Japan; November 6, 2001.  
Department of Chemistry, Clemson University; Clemson, SC; April 18, 2002.  
Department of Chemistry, Emory University; Atlanta, GA; April 19, 2002.  
Department of Chemistry, North Carolina State University; Raleigh, NC; December 6, 2002  
Department of Biochemistry, Albert Einstein Medical School; Bronx, NY; January 14, 2003.  
National Institutes of Health, Institute of Aging, Baltimore, MD; February 28, 2003.  
NIEHS Sealy Center, University of Texas Medical Branch, Galveston, TX; March 3, 2003.  
Department of Chemistry, Wake Forest University; Winston-Salem, NC; March 26, 2003.  
Department of Chemistry and Chemical Biology, Stevens Institute of Technology; Hoboken, NJ; September 17, 2003.  
Department of Chemistry, Duke University; Durham, NC; October 17, 2003.  
Department of Chemistry, Ohio State University; Columbus, OH; November 13, 2003.  
Department of Chemistry and Biochemistry; Ohio University; Athens, OH; November 14, 2003.  
Department of Chemistry, University of Pennsylvania; Philadelphia, PA; December 8, 2003.  
Center in Molecular Toxicology, Vanderbilt University; Nashville, TN; January 23, 2004.  
Department of Chemistry, University of California at Riverside; Riverside, CA; March 3, 2004.  
Baltimore Area Repair Symposium; Towson, MD; March 17, 2004.  
Department of Chemistry, College of the Holy Cross; Worcester, MA; April 2, 2004.  
Department of Chemistry, University of Illinois; Urbana-Champaign, IL; April 15, 2004.  
Department of Chemistry; Salisbury University; September 23, 2004.  
Department of Chemistry; George Mason University; September 30, 2004.  
Department of Biochemistry and Molecular Biology; Johns Hopkins University School of Public Health; November 15, 2004.  
Department of Chemistry; Stanford University; Palo Alto, CA; February 2, 2005.  
Frontiers in Bio-organic Chemistry and Chemical Biology; 229<sup>th</sup> National American Chemical Society Meeting; San Diego, CA; March 14, 2005.  
Department of Biochemistry & Molecular Biology; Penn State College of Medicine; Hershey, PA; April 4, 2005.  
David I. Schuster Chemistry Symposium; New York University; New York, NY; June 3, 2005.  
The Chemistry of Mutagenesis; 230<sup>th</sup> National American Chemical Society Meeting; Washington, D.C.; August 28, 2005.  
Department of Chemistry; Fairmont State University; Fairmont, WV; November 29, 2005.  
Department of Chemistry; Drexel University; Philadelphia, PA; January 18, 2006.  
Department of Chemistry; Oakland University; Rochester, MI; January 26, 2006.

Department of Chemistry; Wayne State University; Detroit, MI; January 27, 2006.

Department of Chemistry & Biochemistry; University of Maryland Baltimore County; Baltimore, MD; March 14, 2006.

Division of Medicinal Chemistry-Division of Molecular Pharmaceutics; School of Pharmacy; University of North Carolina-Chapel Hill; Chapel Hill, NC; March 22, 2006.

IX<sup>th</sup> International Workshop Radiation Damage to DNA; Tekirova, Turkey; May 14-18, 2006.

Radicals in the Rockies V; Telluride Scientific Research Conferences; Telluride, CO; July 17-21, 2006.

Department of Medicinal Chemistry; University of Minnesota; Minneapolis, MN; September 19, 2006.

Presidential Symposium, 34<sup>th</sup> National Radiation Research Society Meeting; Philadelphia, PA; November 7, 2006.

Chemical Biology Conversations; New York Academy of Sciences; New York, NY; November 9, 2006.

Gordon Research Conference on Radicals and Radical Ions in Chemistry and Biology; Holderness School, Plymouth, NH; July 1–5, 2007.

13<sup>th</sup> International Congress of Radiation Research; San Francisco, CA; July 8-12, 2007.

DNA-Based Biomarkers; 234<sup>th</sup> National American Chemical Society Meeting; Boston, MA; August 19, 2007.

Department of Chemistry; Wilkes University; Wilkes-Barre, PA; September 26, 2007.

3<sup>rd</sup> Baltimore Area Repair Symposium; Baltimore, MD; March 27, 2008.

Morgan State University; Baltimore, MD; April 10, 2008.

Department of Pharmacology; Case Western Reserve University; Cleveland, OH; May 13, 2008.

2008 Telluride Workshop on Nucleic Acid Chemistry; Telluride, CO; August 3-8, 2008.

Department of Chemistry; Roanoke College; Salem, VA; October 3, 2008.

Department of Chemistry; University of Bern; Bern, Switzerland; January 16, 2009.

8<sup>th</sup> Winter Research Conferences Oxidative DNA Damage: From Chemical Aspects to Biological Consequences; Les Houches, France; January 18-23, 2009.

Department of Chemistry Colloquium; Duke University; Durham, NC; March 3, 2009.

Organic Free Radicals Ottawa 2009; University of Ottawa; Ottawa, Canada; July 26 – 30, 2009.

2009 Eli Lilly Award in Biological Chemistry Symposium; 238<sup>th</sup> National American Chemical Society Meeting; Washington, D.C.; August 19, 2009.

Complex DNA Damage: From Theory to Biological Consequences; 55<sup>th</sup> Annual Meeting of the Radiation Research Society; Savannah, GA; October 4-7, 2009.

Department of Chemistry; The College of William and Mary; Williamsburg, VA; November 13, 2009.

Department of Chemistry; Northwestern University; Evanston, IL; January 14, 2010.

Department of Chemistry; College of Staten Island, City University of New York; New York, NY; February 17, 2010.

Department of Chemistry; William Paterson University; Wayne, NJ; February 18, 2010.

Department of Chemistry; Ruprecht-Karls Universität Heidelberg; Heidelberg, Germany; May 7, 2010.

Evolving DNA Polymerases: Chemistry Meets Biology; Centro Stefano Franscini, Monte Verità; Switzerland; May 9-14, 2010.

NSF Workshop in the Chemical Sciences, Nucleic Acid Chemistry – Core of Living Systems; Atlanta, GA; May 24-28, 2010.

2010 Telluride Workshop on Nucleic Acid Chemistry; Telluride, CO; August 2-6, 2010.

Effects of Ionizing Radiation on Nucleic Acids: Inspiration for Analytical and Mechanistic Investigations; 56th Annual Meeting of the Radiation Research Society; Maui, HI; September 26-29, 2010.

Department of Chemistry; The College of New Jersey; Ewing, New Jersey; December 1, 2010.

Department of Chemistry Colloquium; Brown University; Providence, RI; April 15, 2011.

Department of Chemistry Colloquium; University of Maryland; College Park, MD; September 23, 2011.

Department of Chemistry; Frostburg State University; Frostburg, MD; October 20, 2011.

Department of Chemistry Colloquium; New York University; New York, NY; November 4, 2011.

Department of Chemistry; McDaniel College; Westminster, MD; February 10, 2012.

Institut Für Chemie Humboldt-Universität zu Berlin; Berlin, Germany; March 7, 2012.

Department of Chemistry; Phillips University – Marburg; Marburg, Germany; March 9, 2012.

9<sup>th</sup> Winter Research Conference, Oxidative DNA Damage and Repair: Chemistry and Biology, Health Consequences and Applications; Les Houches, France; March 11-16, 2012.

Department of Chemistry; Carnegie Mellon University; April 12, 2012.

2012 Telluride Workshop on Nucleic Acid Chemistry; Telluride, CO; July 30-August 3, 2012.

Beckwith Memorial Symposium on Free Radical Chemistry; 244<sup>th</sup> National American Chemical Society Meeting; Philadelphia, PA, August 19-23, 2012.

Chemical Research in Toxicology Young Investigator Award Symposium in honor of Professor Yinsheng Wang; 244<sup>th</sup> National American Chemical Society Meeting; Philadelphia, PA, August 19-23, 2012.

4<sup>th</sup> EuCheMS Chemistry Congress; Prague, Czech Republic; August 26-30, 2012.

Department of Chemistry; Ludwig-Maximilians-Universität; Munich, Germany; August 31, 2012.

58<sup>th</sup> Annual Meeting of the Radiation Research Society; Rio Del Mar, Puerto Rico; September 29 - October 3, 2012.

Department of Chemistry; North Carolina A & T State University; Greensboro, NC; October 16, 2012.

Department of Chemistry; Elizabeth City State University; Elizabeth City, NC; October 17, 2012.

Department of Chemistry; University of Cincinnati; Cincinnati, OH; November 16, 2012.

Department of Biochemistry; University of Maryland School of Medicine; Baltimore, MD; March 4, 2013.

Department of Biochemistry and Molecular Biology; Bloomberg School of Public Health, Johns Hopkins University; Baltimore, MD; April 1, 2013.

Department of Chemistry; Indiana University Purdue University of Indiana; Indianapolis, IN; April 24, 2013.

Technology Center for Networks and Pathways of Lysine Modification; School of Medicine, Johns Hopkins University; May 14, 2013.

6<sup>th</sup> Pacific Symposium on Radical Chemistry; Vancouver, Canada; June 16 - 20, 2013.

Gordon Research Conference, Nucleosides, Nucleotides, and Oligonucleotides; Salve Regina College, June 30 – July 5, 2013.

59<sup>th</sup> Annual Meeting of the Radiation Research Society; New Orleans, LA; September 15 - 18, 2013.

Department of Chemistry & Biochemistry; Florida International University; Miami, FL; April 4, 2014.

Department of Chemistry; University of Georgia; Athens, GA; April 24, 2014.

XIII<sup>th</sup> International Workshop on Radiation Damage to DNA; Cambridge, MA; June 14-18, 2014.

22<sup>nd</sup> IUPAC International Conference on Physical Organic Chemistry; Ottawa, CA; August 10-15, 2014.

Department of Chemistry; Colby College; Waterville, ME; October 10, 2014.

Department of Chemistry; Sweet Briar College; Sweet Briar, VA; November 12, 2014.

ACS-Kanawha Valley and Central Ohio Valley Sections; Huntington, WV; November, 17, 2014.

Department of Chemistry; West Virginia State University; Charleston, WV; November 18, 2014.

Tri-Institutional Chemical Biology Seminar Series; Memorial Sloan-Kettering Cancer Center; New York, NY; January 13, 2015.

Department of Chemistry; St. John's University; New York, NY; March 12, 2015.

Division of Organic Chemistry; Symposium in honor of Professor Eric Kool, recipient of the Ronald Breslow Award in Biomimetic Chemistry; 249<sup>th</sup> National American Chemical Society Meeting; Denver, CO, March 22, 2015.

Institute for Biophysical Research; Department of Biophysics and Biophysical Chemistry; Johns Hopkins University; Baltimore, MD; April 1, 2015.

61<sup>st</sup> Annual Meeting of the Radiation Research Society; Weston, FL; September 19 - 22, 2015.

Department of Chemistry; University of Ottawa; Ottawa, CA; February 2, 2016.

7<sup>th</sup> Baltimore Area Repair Symposium; University of Maryland School of Medicine; Baltimore, MD; March 4, 2016.

Department of Chemistry; St. Francis University; Loretto, PA; March 18, 2016.

Division of Chemical Toxicology; Chemical Research in Toxicology Young Investigator Award Symposium in honor of Professor Yimon Aye; 252<sup>nd</sup> National American Chemical Society Meeting; Philadelphia, PA, August 21, 2016.

Division of Organic Chemistry; Arthur C. Cope Symposium; 252<sup>nd</sup> National American Chemical Society Meeting; Philadelphia, PA, August 23, 2016.

Department of Chemistry; University of California – Davis; Davis, CA; May 16, 2017.

International Symposium on Reactive Intermediates and Unusual Molecules (ISRIUM); Sorrento, Italy; June 18 – 22, 2017.

63<sup>rd</sup> Annual Meeting of the Radiation Research Society; Cancun, Mexico; September 19 - 22, 2017.

Department of Chemistry; Shippensburg St. University; Shippensburg, PA; November 3, 2017.

Division of Organic Chemistry; James Flack Norris Award in Physical Organic Chemistry; Symposium in Honor of Cynthia J. Burrows; 255<sup>th</sup> National American Chemical Society Meeting; New Orleans, LA; March 19, 2018.

XV<sup>th</sup> International Workshop on Radiation Damage to DNA; Aussois, France; May 27 – June 1, 2018.

Pharmaron Inc.; Beijing, China; July 19, 2018.

Department of Pharmaceutical Sciences; Peking University; Beijing, China; July 20, 2018.

Department of Chemistry; Beijing Normal University; Beijing, China; July 20, 2018.

Department of Chemistry; Nankai University; Tianjin, China; July 24, 2018.

Department of Chemistry; Wuhan University; Wuhan, China; July 31, 2018.

Department of Chemistry; Huazhong Agricultural University; Wuhan, China; July 31, 2018.

Department of Chemistry; Nanjing University; Nanjing, China; August 3, 2018.

2019 Mesilla Chemistry Workshop on Protein-Nucleic Acid Interactions; Mesilla, New Mexico; February 10 - 12, 2019.

Department of Chemistry and Biochemistry; Bloomsburg University of Pennsylvania; Bloomsburg, PA; October 4, 2019.



Department of Chemistry; St. John Fisher College; Rochester, NY; October 10, 2019.  
Department of Chemistry; SUNY Geneseo; Geneseo, NY; October, 11, 2019.  
Department of Chemistry; University of California – Riverside; Riverside, CA; November 1, 2019.  
65<sup>th</sup> Annual Meeting of the Radiation Research Society; San Diego, CA; November 3 - 6, 2019.  
Department of Chemistry; New York University; New York, NY; January 31, 2020.  
Department of Chemistry; University of North Carolina – Wilmington; Wilmington, NC; September 24, 2021.  
3<sup>rd</sup> International Conference on Hydrogen Atom Transfer (iCHAT 2020); Villa Mondragone, Italy; June 20-24, 2022.  
2020 Telluride Workshop on Nucleic Acid Chemistry; Telluride, CO; July 25-29, 2022.

**Invited Participation at Conferences:**

Session Chair, American Chemical Society Division of Organic Chemistry, 205th ACS National Meeting, Denver, CO, March 1993.  
Session Chair, Physical Organic Chemistry Gordon Research Conference, Plymouth NH, July 1993.  
Session Chair, American Chemical Society Division of Organic Chemistry, 209th ACS National Meeting, Anaheim CA, April 1995.  
Session Chair, Free Radical Reactions Gordon Research Conference, Plymouth NH, July 1995.  
4th Annual German-American Frontiers of Science Symposium, Co-sponsored by the U.S. National Academy of Sciences, Alexander Von Humboldt Foundation, and the Max Planck Society; Arnold and Mabel Beckman Center, Irvine, CA; June 4-6, 1998.  
Vice Chairperson, Free Radical Reactions Gordon Research Conference, Plymouth NH, July 1999.  
Chairperson, Free Radical Reactions Gordon Research Conference, Plymouth NH, July 2001.  
Governing Board, Reaction Mechanisms Conference (2004-2008).  
Organizing Committee, David I. Schuster Chemistry Symposium; New York University; New York, NY; June 3, 2005.  
International Scientific Committee, IX<sup>th</sup> International Workshop on Radiation Damage to DNA; Tekirova, Turkey; May 14-18, 2006.  
Co-Organizer, 1<sup>st</sup> Frontiers at the Chemistry and Biology Interface Symposium; University of Maryland College Park, MD; April 12, 2008.  
Co-Founder and Co-Organizer, 2008 Telluride Workshop on Nucleic Acid Chemistry; Telluride, CO; August 3-9, 2008.  
Organizer of Jerome A. Berson Tribute Session at Reaction Mechanisms Conference; Amherst, MA; June 23-27, 2010.  
Co-Organizer, 2010 Telluride Workshop on Nucleic Acid Chemistry; Telluride, CO; August 2-6, 2010.  
Program Committee, 56<sup>th</sup> Annual Meeting of the Radiation Research Society; Maui, HI; September 25-29, 2010.  
Organizer, 2012 Telluride Workshop on Nucleic Acid Chemistry; Telluride, CO; July 30-August 3, 2012.  
Session Chair, 58<sup>th</sup> Annual Meeting of the Radiation Research Society: Rio Del Mar, Puerto Rico; September 29- October 3, 2012.  
International Scientific and Program Committee, XIII<sup>th</sup> International Workshop on Radiation Damage to DNA; Boston, MA; June 14-18, 2014.  
Co-Organizer, Jerome A. Berson Memorial; Yale University; New Haven, CT; April 15, 2019.

**Submitted Presentations at Meetings:**

1. Mechanistic Studies of DNA Damage Via Independent Generation of Reactive Intermediates.  
Barvian, M. R.; Greenberg, M. M. *American Chemical Society Division of Organic Chemistry*, 203rd ACS National Meeting, San Francisco, CA, April 1992.
2. Independent Generation of the Predominant Reactive Intermediate Formed Upon Reaction Between Hydroxyl Radical and Thymidine.  
Barvian, M. R.; Greenberg, M. M. *CU-Syntex Symposium*, Boulder, CO, June 1992.
3. Structural Effects on Cyclopropylmethyl Radical Equilibria.  
Venkatesan, H.; Greenberg, M. M. *American Chemical Society Division of Organic Chemistry*, 204th ACS National Meeting, Washington, DC, August 1992.
4. Diastereoselective Synthesis of the Major Products Resulting From the Interaction Between Ionizing Radiation and Thymidine.  
Barvian, M. R.; Greenberg, M. M. *American Chemical Society Division of Organic Chemistry*, 205th ACS National Meeting, Denver, CO, March 1993.
5. Photochemical Cleavage of Oligonucleotides from Solid Phase Supports.  
Gilmore, J. L.; Greenberg, M. M. *American Chemical Society Division of Organic Chemistry*, 205th ACS National Meeting, Denver, CO, March 1993.
6. Generation and Study of Reactive Intermediates Involved in Nucleic Acid Cleavage Processes. Free Radical Reactions Gordon Research Conference, July 1993.
7. Reactivity of the Adducts of Hydroxyl Radical and Pyrimidine Nucleosides.  
Barvian, M. R.; Greenberg, M. M. *American Chemical Society Division of Organic Chemistry*, 206th ACS National Meeting, Chicago, IL, August 1993.
8. Studies on the Mechanism of UV-Sensitization of DNA Damage by 5-Bromodeoxyuridine.  
Cook, G. P.; Greenberg, M. M. *American Chemical Society Division of Organic Chemistry*, 206th ACS National Meeting, Chicago, IL, August 1993.
9. Independent Generation and Study of the Major Adduct of Thymidine and Hydrogen Atom.  
Barvian, M. R.; Greenberg, M. M. *American Chemical Society Division of Organic Chemistry*, 206th ACS National Meeting, Chicago, IL, August 1993.
10. Mechanistic Studies of Nucleic Acid Damage  
Greenberg, M. M. *Bioorganic Gordon Research Conference*, June 1994.
11. Orthogonal Linkers in Oligonucleotide Synthesis  
Greenberg, M. M. *Bioorganic Gordon Research Conference*, June 1994.
12. Regioselectivity of the Rearrangement of a Conformationally Constrained-Cyclopropyl Benzyl Radical.  
Venkatesan, H.; Greenberg, M. M. *American Chemical Society Division of Organic Chemistry*, 208th ACS National Meeting, Washington, D.C., August 1994.
13. Orthogonal Linkers in Oligonucleotide Synthesis.  
Yoo, D. J.; Greenberg, M. M. *American Chemical Society Division of Organic Chemistry*, 208th ACS National Meeting, Washington, D.C., August 1994.
14. Independent Generation of Reactive Intermediates Involved in Nucleic Acid Damage Utilizing Norrish Type I Photochemistry.  
Barvian, M. R.; Goodman, B. K.; Yoo, D. J.; Greenberg, M. M. *American Chemical Society Division of Organic Chemistry*, 208th ACS National Meeting, Washington, D.C., August 1994.
15. Incorporation of the Alkaline Labile, Oxidative Stress Product, 5R-5,6-Dihydro-5-hydroxythymidine in an Oligonucleotide.

- Matray, T. J.; Greenberg, M. M. American Chemical Society Division of Organic Chemistry, 208th ACS National Meeting, Washington, D.C., August 1994.
- Matray, T. J.; Greenberg, M. M. American Chemical Society Division of Organic Chemistry, 208th ACS National Meeting, Washington, D.C., August 1994.
16. Site Specific Generation and Reactivity of 5,6-Dihydrothymid-5-yl in Oligonucleotides.  
Barvian, M. R.; Greenberg, M. M. American Chemical Society Division of Organic Chemistry, 209th ACS National Meeting, Anaheim, CA, April 1995.
  17. Mechanistic Investigation of UV Sensitization of Nucleic Acid Strand Scission by 5-Bromodeoxyuridine.  
Cook, G. P.; Greenberg, M. M. American Chemical Society Division of Organic Chemistry, 209th ACS National Meeting, Anaheim, CA, April 1995.
  18. Mechanistic Studies of Radical Processes Involved in Nucleic Acid Damage. Greenberg, M. M. Free Radical Reactions Gordon Research Conference, July 1995.
  19. Palladium Labile Oligonucleotide Synthesis Supports.  
Matray, T. J.; Yoo, D. J.; Greenberg, M. M. American Chemical Society Division of Organic Chemistry, 211th ACS National Meeting, New Orleans, LA, March 1996.
  20. Enzymatic Inhibition by Modified Forms of Thymidine.  
Matray, T. J.; Greenberg, M. M. American Chemical Society Division of Organic Chemistry, 211th ACS National Meeting, New Orleans, LA, March 1996.
  21. Investigation of Nucleic Acid Strand Scission Involving 5-Bromodeoxyuridine.  
Cook, G. P.; Greenberg, M. M. CU-Syntex Symposium, Boulder, CO, May 1996
  22. Bioconjugate Synthesis Using Protected Oligonucleotides.  
McMinn, D. L.; Matray, T. J.; Greenberg, M. M. American Chemical Society Division of Organic Chemistry, 213th ACS National Meeting, San Francisco, April 1997.
  23. Generation and Reactivity of Nucleoside Peroxyl Radicals.  
Tallman, K. A.; Tronche, C.; Greenberg, M. M. American Chemical Society Division of Organic Chemistry, 216th ACS National Meeting, Boston, August 1998.
  24. Nonphotochemical Electron Transfer Induced Decomposition of an Alkylphenyl Selenide by Tris[3-methoxyethoxy]propylstannane.  
Tallman, K. A.; Greenberg, M. M. American Chemical Society Division of Organic Chemistry, 216th ACS National Meeting, Boston, August 1998.
  25. Oxygen Transfer From Tirapazamine to DNA Radicals.  
Fuchs, T. E.; Daniels, J. S.; Greenberg, M. M.; Gates, K. S. American Chemical Society Division of Chemical Toxicology, 216th ACS National Meeting, Boston, August 1998.
  26. Investigation of Cation Radical Formation by Heterolysis  $\beta$  to a Radical Center.  
Bales, B. ; Greenberg, M. M. American Chemical Society Division of Organic Chemistry, 219th ACS National Meeting, San Francisco, April 2000.
  27. Independent Generation and Reactivity of the 5,6-Dihydro-2'-deoxyuridin-6-yl Radical.  
Carter, K. N.; Greenberg, M. M. American Chemical Society Division of Organic Chemistry, 221st ACS National Meeting, San Diego, April 2001.
  28. Synthesis and Study of Homo-C-Nucleotide Analogues of Deoxyadenosine Formamidopyrimidine (Fapy•dA).  
Delaney, M. O.; Greenberg, M. M. American Chemical Society Division of Organic Chemistry, 221st ACS National Meeting, San Diego, April 2001.
  29. The Repair and Mutagenesis of Formamidopyrimidines.  
Wiederholt, C. J.; Delaney, J. C.; Essigmann, J. M.; Greenberg, M. M. Gordon Research Conference, Mutagenesis; August 2002.
  30. Biological Effects of 2-Deoxyribonolactone and the C4-Oxidized Abasic Site.

- Kroeger, K. M.; Kow, Y. W.; Goodman, M. F.; Greenberg, M. M. Gordon Research Conference, Mutagenesis & Carcinogenesis; March 2004.
31. The Biochemical Properties of *N*6-(2-Deoxy-D-pentofuranosyl)-6-diamino-5-formamido-4-hydroxypyrimidine (Fapy•dG).  
Wiederholt, C. J.; Delaney, J. C.; Kalam, M. A.; Pope, M. A.; Basu, A. K.; Essigmann, J. M.; David, S. S.; Greenberg, M. M. National Organic Symposium, Salt Lake City, UT; June, 2005.
  32. Analysis of 2-Deoxyribonolactone in DNA Using Cysteine Conjugates.  
Xue, L.; Sato, K.; Greenberg, M. M. 230th ACS National Meeting; Washington, DC, Aug 28-Sept 1, 2005.
  33. Efficient DNA Interstrand Cross-link Formation From a Nucleotide Radical.  
Hong, I. S.; Ding, H.; Greenberg, M. M. 230th ACS National Meeting; Washington, DC, Aug 28-Sept 1, 2005.
  34. Biochemical Characterization of Formamidopyrimidine Lesions.  
Patro, J. N.; Wiederholt, C. J.; Jiang, Y. L.; Haraguchi, K.; Greenberg, M. M. 230th ACS National Meeting; Washington, DC, Aug 28-Sept 1, 2005.
  35. Repair of Oxidized Guanines by OG Glycosylases.  
Krishnamurthy, N.; Haraguchi, K.; Wiederholt, C. J.; Muller, J. G.; Burrows, C. J.; Greenberg, M. M.; David, S. S. 230th ACS National Meeting; Washington, DC, Aug 28-Sept 1, 2005.
  36. Interstrand Cross-link (ICL) Formation by the C4'-Oxidized Abasic Site in DNA.  
Sczepanski, J. T.; Jacobs, A.; Greenberg, M. M. 236th ACS National Meeting, Philadelphia, PA, August 17-21, 2008.
  37. DNA Interstrand Cross-linking by Modified Nucleotides: Mechanism and Applications.  
Peng, X.; Hong, I. S.; Greenberg, M. M. 236th ACS National Meeting, Philadelphia, PA, August 17-21, 2008.
  38. Replication of an Oxidized Abasic Site: The Structural Basis for Breaking the A-Rule.  
Huang, H.; Greenberg, M. M. 236th ACS National Meeting, Philadelphia, PA, August 17-21, 2008.
  39. Formation of the 5,6-Dihydrouridin-6-yl Radical in RNA Results in Direct Strand Scission.  
Resendiz, M. J.; Jacobs, A. C.; Greenberg, M. M.; 240th ACS National Meeting, Boston, MA, August 22-26, 2010.
  40. Processing of 8-Oxo-7,8-Dihydroguanine and 2-Deoxyribonolactone When Present Within a Clustered DNA Damage Site.  
Cuniffe, S.; Shah, V.; O'Neill, P.; Greenberg, M. M.; Lomax, M.; 14<sup>th</sup> International Congress of Radiation Research, Warsaw, Poland, August 28 – September 1, 2011.
  41. Modified Thymidine for Imaging HSV1-TK Expression with CEST-MRI.  
Bar-Shir, A.; Liu, G.; Yadav, N. N.; McMahon, M. T.; Pomper, M. G.; Tallman, K. A.; Greenberg, M. M.; van Zijl, P. C.M.; Bulte, W. M. J.; Gilad, A. A.; 2011 World Molecular Imaging Congress, San Diego, CA, September 7-10, 2011.
  42. Reactivities of Reactive Intermediates in Nucleosome Core Particle.  
Weng, L.; Greenberg, M.; 244th ACS National Meeting, Philadelphia, PA, August 19-23, 2012.
  43. Rapid DNA Strand Scission at Abasic Sites in Nucleosome Core Particles.  
Zhou, C.; Sczepanski, J. T.; Greenberg, M. M.; 244th ACS National Meeting, Philadelphia, PA, August 19-23, 2012.
  44. Interstrand DNA Cross-Link Formation from a Pyrimidine Cation Radical.

- San Pedro, J. M. N.; Greenberg, M. M.; 244th ACS National Meeting, Philadelphia, PA, August 19-23, 2012.
45. Interstrand DNA-DNA Cross-Link Generated by the Reaction of an Adenosine Residue with an Opposing Abasic Site in Duplex DNA.  
Price, N.; Johnson, K.; Fekry, M.; Wong, R.; Greenberg, M. M.; Gates, K. S.; 244th ACS National Meeting, Philadelphia, PA, August 19-23, 2012.
  46. Probing For the Interactions Between Nucleosomal DNA and N-terminal Histone Tails Within a Nucleosome Core Particle.  
Weng, L.; Greenberg, M. M.; 247<sup>th</sup> ACS National Meeting, Dallas, TX, March 16-20, 2014.
  47. Self-Catalyzed Modification of Histone Proteins in Nucleosome Core Particles Containing Damaged DNA.  
Weng, L.; Greenberg, M. M.; 247<sup>th</sup> ACS National Meeting, Dallas, TX, March 16-20, 2014.
  48. Replication Dependent DNA Repair of DNA Interstrand Cross-Links by Human Translesion DNA Polymerases.  
Xu, W.; Ghosh, S.; Ouellette, A.; Greenberg, M. M.; Zhao, L.; 250<sup>th</sup> ACS National Meeting, Boston, MA, August 16-20, 2015.
  49. Rapid RNA Cleavage From a C2' Radical.  
Paul, R.; Greenberg, M. M.; Nucleosides, Nucleotide, and Oligonucleotides Gordon Research Conference; Newport, R.I.; July, 2015.
  50. Chemistry of Independently Generated Thymidine Radical Cation: DNA Hole Transfer and Other Competing Processes.  
Sun, H.; Greenberg, M. M.; 254<sup>th</sup> ACS National Meeting, Washington, D.C., August 20-24, 2017.
  51. Abasic and Oxidized Abasic Lesion Bypass by DNA Polymerase Theta Yields One- and Two-Nucleotide Deletions.  
Lavery, D.; Greenberg, M. M.; 254<sup>th</sup> ACS National Meeting, Washington, D.C., August 20-24, 2017.
  52. Independent Generation of 2'-Deoxyadenosine-N6-yl Radical and its Reactivity in DNA.  
Zheng, L.; Greenberg, M. M.; 254<sup>th</sup> ACS National Meeting, Washington, D.C., August 20-24, 2017.
  53. Independent Generation of Neutral Purine Radicals Involved in DNA Damage.  
Zheng, L.; Greenberg, M. M.; 254<sup>th</sup> ACS National Meeting, Washington, D.C., August 20-24, 2017.
  54. Histone Protein Tails Inhibit Depurination of N7-Methylated Deoxyguanosine and Form DNA-Protein Crosslinks With Alkylated DNA in Nucleosome Core Particles.  
Yang, K.; Greenberg, M. M.; 254<sup>th</sup> ACS National Meeting, Washington, D.C., August 20-24, 2017.
  55. Interactions of DNA Polymerase Theta with Oxidative DNA Damage.  
Lavery, D. J.; Greenberg, M. M.; Baltimore Area Repair Symposium, Baltimore, MD, March 12, 2018.
  56. Histone protein tails inhibit depurination of N7-methylated deoxyguanosine and form DNA-protein crosslinks with alkylated DNA in nucleosome core particles.  
Yang, K.; Greenberg, M. M.; Baltimore Area Repair Symposium, Baltimore, MD, March 12, 2018.
  57. Irreversible Inhibition of DNA Polymerases.  
Paul, R.; Yufas, S.; Greenberg, M. M.; Baltimore Area Repair Symposium, Baltimore, MD, March 12, 2018.

58. Histone Protein Tails Inhibit Depurination of N7-Methylated Deoxyguanosine and Form DNA-Protein Crosslinks With Alkylated DNA in Nucleosome Core Particles and Cells.  
Yang, K.; Greenberg, M. M.; Chromatin and Chromosomes Workshop, Baltimore, MD, December 17, 2018.
59. Translesion Synthesis of Tandem Lesions Containing 2-Deoxyribonolactone 5' to Thymine Glycol in Human Cells.  
Naldiga, S.; Huang, H.; Greenberg, M. M.; Basu, A. K.; 258<sup>th</sup> ACS National Meeting, San Diego, CA, August 23-26, 2019.

**Invention Disclosures:**

1. Photochemical Cleavage of Oligonucleotides from Solid Supports; August 1992. (Initial option obtained by Research Corporation.)
2. Universal Orthogonal Linkers for Solid Phase Oligonucleotide Synthesis; April 1994. (Licensed by Glen Research Inc., Sterling VA.)
3. Universal Solid Phase Oligonucleotide Synthesis Supports for the Synthesis of Oligonucleotides Containing 3'-Alkyl Amines; June 1995. (Licensed by Glen Research Inc., Sterling VA.)
4. An Efficient Photolabile Solid Phase Oligonucleotide Synthesis Support that Releases Oligonucleotides Containing 3'-Hydroxyl Groups; June 1995.
5. Adaptation of o-Nitrobenzyl Photolabile Solid Phase Oligonucleotide Synthesis Supports to Commonly Available Irradiation Sources; August 1995.
6. Palladium Labile Orthogonal Solid Phase Oligonucleotide Synthesis Supports, November 1995. (Provisional Patent filed; First stage licensing by Research Corporation.)
7. Bioconjugate Formation of Protected Oligonucleotides Containing Alkyl Amines In Aprotic Solvents, November 1996. (Provisional Patent filed.)
8. New Advances in the Bioconjugation of Protected Oligonucleotides Containing 3'-Alkyl Amines in Aprotic Organic Solvents, October 1997.
9. Bioconjugate Formation of Protected Oligonucleotides Containing 3'-Alkyl Carboxylic Acids in Aprotic Organic Solvents, October 1997.
10. Novel Compounds and Method for Introducing Structural Diversity in Chemically Synthesized Oligonucleotides, March 1998.
11. Reagents for the Selective Detection of the C1'-Oxidized Abasic Site (2-Deoxyribonolactone) in DNA; December 2004. (Provisional Patent filed; January 11, 2005)
12. Modified Nucleotides for Producing Interstrand DNA Cross-links. June 2005.
13. Selective, facile, quantitative detection of 8-oxo-7,8-dihydro-2'-deoxyguanosine (OxodG) and 2'-deoxyguanosine formamidopyrimidine (Fapy•dG), March 2007. (Provisional patent filed; April 3, 2007)
14. Selective, facile, quantitative detection of oxidized abasic lesions in DNA, March 2007. (Provisional patent filed; April 3, 2007)
15. Selective, facile, quantitative detection of 8-oxo-7,8-dihydro-2'-deoxyguanosine (OxodG) using a fluorescent probe, August 2007. (Provisional patent filed, September 2007)
16. Facile, PCR free detection of DNA with single nucleotide discrimination, August 2007. (Provisional patent filed, September 2007)
17. Irreversible inhibitors of DNA Polymerase  $\beta$ , May 2013. (US Patent 9,029,346)
18. Biosynthetic Labeling and Separation of RNA, July 2015.
19. DNA Polymerase Beta Inhibitors, August 2016. (US Patent 10,711,027; issued July 14, 2020)
20. Identification of DNA polymerase Theta inactivation mechanism. (WO/2020/014297).
21. Chemical Probes to Identify Direct Binders of Poly(ADP-ribose) of Defined Chain Length. (October 31, 2019)
22. Solid-phase synthesis of oligonucleotides containing N6-(2-Deoxy- $\alpha,\beta$ -D-erythropentofuranosyl)-2,6-diamino-4-hydroxy-5-formamidopyrimidine (Fapy•dG). (Provisional patent application filed; January 28, 2020.)
23. Extra- and Intracellular Selective, Covalent Inactivation of DNA Polymerase Beta. (Provisional patent application filed; May 17, 2021.)
24. Synthetic Lethality Between Homologous Recombination and DNA Polymerase Beta Repair Pathways. (Provisional patent application filed; May 17, 2021.)