

Curriculum Vitae (3/26/2009)
John-Stephen Taylor

Mailing Address: Department of Chemistry
Campus Box 1134
Washington University
1 Brookings Drive
St. Louis, MO 63130
(314)-889-6721

Birth: Fredericton, NB, Canada, June 17, 1954

Education: 1981 Ph. D. Columbia University
Thesis: "An Approach to the Total Synthesis of Daunomycinone"
Advisor: Gilbert Stork
1976 S.B. Massachusetts Institute of Technology

Professional History: 1997 Professor of Chemistry, Washington University
1990-97 Associate Professor of Chemistry, Washington University, Member of the Division of Biomedical Sciences, Molecular Biology: Genetics and Biochemistry Program
1983-90 Assistant Professor of Chemistry, Washington University
1981-83: Postdoctoral Research Associate, California Institute of Technology
1981-1983
Project: Design and Synthesis of Sequence-Specific DNA Cleaving Agents, DNA Affinity Cleaving.
Advisor: Peter B. Dervan

Honors: 2005-7 Special Recognition for Excellence in Mentoring, Washington University
1999 Ad Hoc Member of the NIH Bioorganic and Natural Products Study Section.
1993-01 NIH MERIT Award
1993 St. Louis Section ACS Award in Chemistry
1988-90 Alfred P. Sloan Foundation Fellow
1981-83 Damon Runyon-Walter Winchell Cancer Fund Fellow
1981 Pegram Award for Outstanding Graduate Work, Columbia University
1977,8 Teaching Award, Columbia University
1976 Merck Index Award for Scholastic Excellence in Chemistry, Massachusetts Institute of Technology
1975 Phi Beta Kappa, MIT

Research Interests: Unraveling the molecular pathway from sunlight to the mutations that lead to skin cancer, photocaged DNA, design and synthesis of nucleic acid-triggered prodrug activation as a chemotherapeutic principle, design of peptide nucleic acid-based PET and optical gene expression imaging agents, design of peptide nucleic acid and polyamide antisense and antigene agents, mechanism of action of flavone natural products.

Research Group: 10 Ph.D. students, 3 postdocs, 1 undergraduate

Professional Affiliations: American Chemical Society (Organic, Inorganic & Biological Chemistry Divisions)

RESEARCH PUBLICATIONS (* = publications prior to being a Professor):

- * 1. "Design and Synthesis of a Sequence Specific DNA Cleaving Molecule. (Distamycin-EDTA)iron(II)", P.G. Schultz, J.S. Taylor and P.B. Dervan*, *J. Am. Chem. Soc.* **1982**, *104*, 6861-6863.
- * 2. "DNA Affinity Cleaving. Sequence Specific Cleavage by Distamycin-EDTA-Fe(II) and EDTA-Distamycin-Fe(II)", J.S. Taylor, P.G. Schultz and P.B. Dervan*, *Tetrahedron* **1984**, *40*, 457-465.
3. "DNA, Light and Dewar Pyrimidinones: The Structure and Biological Significance of TpT3." John-Stephen Taylor* and Michael P. Cohrs, *J. Am. Chem. Soc.*, **1987**, *109*, 2834-2835.
4. "A Building Block for the Sequence Specific Introduction of cis-syn Thymine Dimers into Oligonucleotides. Solid Phase Synthesis of TpT[c,s]pTpT." John-Stephen Taylor*, Ian R. Brockie and Christine L. O'Day, *J. Am. Chem. Soc.*, **1987**, *109* 6735-6742.
5. "Models for the Solution State Structure of the (6-4) Photoproduct of Thymidylyl-(3'→5')-thymidine Derived via a Distance and Angle Constrained Conformation Search Procedure." John-Stephen Taylor*, Daniel S. Garrett and Michael J. Wang, *Biopolymers*, **1988**, *27*, 1571-1593.
6. "Synthesis of a Trans-Syn Thymine Dimer Building Block. Solid Phase Synthesis of CGTAT[t,s]TATGC." John-Stephen Taylor* and Ian R. Brockie, *Nucleic Acids Res.* **1988**, *16*, 5123-5136.
7. "Solution State Structure of the Dewar Pyrimidinone Photoproduct of Thymidylyl-(3'→5')-thymidine." John-Stephen Taylor*, Daniel S. Garrett and Michael P. Cohrs, *Biochemistry*, **1988**, *27*, 7206-7215.
8. "Synthesis of a Bacteriophage DNA Containing a Site-Specific Cis-Syn Thymine Dimer" John-Stephen Taylor* and Christine L. O'Day, *J. Am. Chem. Soc.* **1989**, *111*, 401-402
9. "Cis-Syn Thymine Dimers Are Not Absolute Replication Blocks to DNA Polymerase I of *E. Coli*." John-Stephen Taylor* and Christine L. O'Day, *Biochemistry*, **1990**, *29*, 1624-1632.
10. "Quantitative Conversion of the (6-4) Photoproduct of TpdC to a Dewar Photoproduct upon Exposure to Simulated Sunlight" John-Stephen Taylor*, Hwang-Fun Lu and John Kotyk, *Photochem. Photobiol.* **1990** *51*, 161-167.
11. "Electron Paramagnetic Resonance Studies of Pyrimidinones" Yi Lu, Tien-Sung Lin*, and John-Stephen Taylor, *J. Phys. Chem.* **1990** *94*, 4067-4068.
12. "DNA, Sunlight and Skin Cancer", John-Stephen Taylor*, *J. Chem. Ed.* **1990**, *67*, 835-841.

13. "¹H NMR Assignment and Melting Temperature Study of cis-syn and trans-syn Thymine Dimer Containing-Duplexes of d(CGTATTATGC)-d(GCATAATACG)" John-Stephen Taylor*, Daniel Garrett, Ian R. Brockie, Daniel Svoboda and Joshua Telser, *Biochemistry* **1990**, *29*, 8858-8866.
14. "Unraveling the Origin of the Major Mutation Induced by Ultraviolet Light, the C→T Transition Mutation at dTpdC Sites. Design and Synthesis of a DNA Synthesis Building Block for the Cis-Syn Cyclobutane Dimer of dTpdU." John-Stephen Taylor* and Sourena Nadji, *Tetrahedron* **1991** *47*, 2579-2590.
15. "Site-Specific Effect of Thymine Dimer Formation on A-Tract Bending and Its Biological Implications." Cheng-I. Wang and John-Stephen Taylor*, *Proc. Natl. Acad. Sci. U. S. A.* **1991** *88*, 9072-9077.
16. "In Vitro Evidence that UV-Induced Frameshift and Substitution Mutations at T-Tracts are the Result of Misalignment-Mediated Replication Past a Specific Thymine Dimer". Cheng-I. Wang and John-Stephen Taylor*, *Biochemistry* **1992**, *31* 3671-3681.
17. "Synthesis and Characterization of a Series of (dien)Pt(II) Derivatives as Potential Nucleic Acid Conformation and Structure Probes." John-Stephen A. Taylor*, Rushdi Alul and Martin B. Cleaver, *Inorg. Chem.* **1992** *31*, 3636-3646.
18. "Photochemically and Photoenzymatically Cleavable DNA" Sourena Nadji, Cheng-I. Wang and John-Stephen Taylor*, *J. Am. Chem. Soc.* **1992** *114*, 9266-9269.
19. "PCNA-Induced DNA Synthesis Past Cis-Syn and Trans-Syn-I Thymine Dimers by Polymerase δ in vitro" Christine L. O'Day, Peter M. J. Burgers and John-Stephen Taylor*, *Nucl. Acids Res.* **1992** *20*, 5403-5406.
20. "In Vivo Evidence that UV-Induced C→T Mutations at Dipyrimidine Sites Could Result from the Replicative Bypass of Cis-Syn Cyclobutane Dimers or Their Deamination Products", John-Stephen Taylor* and Nan Jiang, *Biochemistry*, **1993**, *32*, 472-481.
21. "Further characterization of eukaryotic nucleotide excision nuclease: Removal of thymine dimer and psoralen monoadduct by HeLa cell free extract and of thymine dimer by xenopus laevis oocytes", Daniel L. Svoboda, John-Stephen Taylor, John E. Hearst, and Aziz Sancar*, *J. Biol. Chem.*, **1993**, *268*, 1931-1936
22. "Preparation and Characterization of a Set of Oligonucleotide 49-mers Containing Site-Specific Cis-Syn, Trans-Syn-I, (6-4) and Dewar Photoproducts of TpT Sites." Colin Smith and John-Stephen Taylor*, *J. Biol. Chem.*, **1993**, *268*, 11143-11151.
23. "Effect of Sequence, Adduct Type, and Opposing Lesions on the Binding and Repair of UV Photodamage by DNA Photolyase and (A)BC Excinuclease", Daniel L. Svoboda, Colin A. Smith, John-Stephen A. Taylor, and Aziz Sancar*, *J. Biol. Chem.*, **1993**, *268*, 10694-10700.
24. "The Trans-Syn-I Thymine Dimer Bends DNA by $\approx 22^\circ$ and Unwinds DNA by $\approx 15^\circ$ ", Cheng-I. Wang and John-Stephen Taylor*, *Chem. Res. Toxicol.*, **1993**, *6*, 519-523.
25. "Identification and Structure Determination of a Third Cyclobutane Dimer of Thymidylyl-(3'→5')-Thymidine: The Trans-Syn-II Product" Jeffrey Kao, Sourena Nadji, John-Stephen Taylor*, *Chemical Research in Toxicology*, **1993**, *6*, 561-567.
26. "DNA Photolyase Repairs the Trans-Syn Cyclobutane Thymine Dimer" Sang-Tae Kim, Khushbeer Malhotra, Colin A. Smith, John-Stephen Taylor and Aziz Sancar*, *Biochemistry*, **1993**, *32*, 7065-7068.
27. "Comparative analysis of binding of human damaged DNA-binding protein (XPE) and Escherichia coli UvrA Damage recognition protein (uvrA) to the major UV photoproducts: T[c,s]T, T[t,s]T, T[6-4]T, and T[Dewar]T" Joyce T. Reardon, Anne F. Nichols, Scott Keeney,

- Colin A. Smith, John-Stephen Taylor, Stuart Linn, and Aziz Sancar*, *J. Biol. Chem.* **1993**, 268, 21301-21308.
28. "Unraveling the Molecular Pathway from Sunlight to Skin Cancer", John-Stephen Taylor*, *Accounts Chem. Res.*, **1994**, 27, 76-82.
 29. "Characterization of (6-4) photoproduct DNA photolyase", Kim, S.T., Malhotra, K.; Smith, Colin A.; Taylor, John-Stephen; Sancar*, Aziz, *J. Biol. Chem.*, **1994**, 269, 8535-8540.
 30. "Transcript cleavage by RNA polymerase II arrested by a cyclobutane pyrimidine dimer in the DNA template", Brian A. Donahue, Shang Yin, John-Stephen Taylor, Daniel Reines, and Phillip C. Hanawalt*, *Proc. Natl. Acad. Sci.* **1994** 91, 8502-8506
 31. "Eliciting a DNA Photoproduct-Specific Antibody with a Dinucleotide Photoproduct Antigen", Xiaodong Zhao and John-Stephen Taylor*, *J. Am. Chem. Soc.*, **1994** 116 8870-8876.
 32. "A new ATP-independent DNA endonuclease from *Schizosaccharomyces pombe* that recognizes cyclobutane pyrimidine dimers and 6-4 photoproducts." Bowman K K; Sidik K; Smith C A; Taylor J S; Doetsch* P W; Freyer, G A, *Nucleic Acids Res*, **1994** 22, 3026-32.
 33. "DNA, Sunlight and Skin Cancer", John-Stephen Taylor*, *Int. Union Pure Appl. Chem.*, **1995** 67,183-190.
 34. "Preparation and Characterization of a Deoxyoligonucleotide 49-mer Containing a Site-specific Thymidylyl-(3'-5')-deoxyadenosine Photoproduct", Xiaodong Zhao and John-Stephen A. Taylor*, *Biochemistry*, **1995** 34, 1386-1392.
 35. "T4 endonuclease V protects the DNA strand opposite a thymine dimer from cleavage by the footprinting reagents DNase I and 1,10-phenanthroline." Latham, K. A., Taylor, J-S., Lloyd*, RS. *J. Biol. Chem.* **1995**, 270, 3765-3771.
 36. "Design and synthesis of a versatile photocleavable DNA building block. Application to phototriggered hybridization." Ordoukhanian, P; Taylor*, J-S., *J. Am. Chem. Soc.* **1995** 117, 9571-2.
 37. "Mutation Spectra of M13 Vectors Containing Site-Specific Cis-Syn, Trans-Syn-I, Trans-Syn-II, (6-4) and Dewar Pyrimidinone Photoproducts of Thymidylyl-(3'→5')-Thymidine in *Escherichia coli* Under SOS Conditions." Colin A. Smith, Mu Wang, Linda Che, Nan Jiang, and John-Stephen Taylor*, *Biochemistry*, **1996**, 35, 4146-4154.
 38. "Remarkable Photoreversal of a Thio Analog of the Dewar Valence Isomer of the (6-4) Photoproduct of DNA to the Parent Nucleotides. Jianquan Liu and John-Stephen Taylor*, *J. Am. Chem. Soc.* **1996**, 118, 3287-3288.
 39. "Structure of d(TpA)*, the major photoproduct of thymidylyl-(3'-5')-deoxyadenosine. Xiaodong Zhao, Sourena Nadji, Jeffrey Kao, John-Stephen Taylor*, *Nucl. Acids Res.*, **1996**, 24, 1554-1560.
 40. "Mutation spectra of TA*, the major photoproduct of thymidylyl(3'-5')-adenosine, in *E. coli* under SOS induction" Xiaodong Zhao and John-Stephen Taylor*, *Nucleic Acids Res.* **1996**, 24, 1561-1565.
 41. "Purification and partial characterization of (6-4) photoproduct DNA photolyase from *Xenopus laevis*." Kim, S.-T., Malhotra, K., Taylor, J.-S., and Sancar, A. **1996** *Photochem. Photobiol.* 63, 292-295.
 42. "Ultraviolet irradiation produces novel endonuclease III-sensitive cytosine photoproducts at dipyrimidine sites" J. Jen, D. L. Mitchell, R. P. Cunningham, C. A. Smith, J-S Taylor, and J. E. Cleaver*, *Photochem. Photobiol.* **1997** 65 323-329.
 43. "Solid phase supported thymine dimers for the construction of dimer-containing DNA by combined chemical and enzymatic synthesis. A potentially general method for the efficient

- incorporation of modified nucleotides into DNA." Phillip Ordoukhanian, John-Stephen Taylor*, **1997**, *Nucl. Acids Res.* 25, 3783-3786.
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 45. Structural determination of isomeric hexadeoxynucleotide photoproducts by fast atom bombardment and tandem mass spectrometry. David Vollmer, Xiaodong Zhao, John-Stephen Taylor, and Michael L. Gross*, **1997**, *International Journal of Mass Spectrometry and Ion Processes*, 165/166, 487-496.
 46. Bypass of a Site-specific cis-syn thymine dimer in an SV40 vector during in vitro replication by HeLa and XPV cell free extracts. Ingrid Ensich-Simon, Peter M. J. Burgers, and John-Stephen Taylor*, **1998** *Biochemistry*, 37, 8218-8226.
 47. Template-directed photoligation of oligonucleotides via 4-thiothymidine. Jianquan Liu and John-Stephen Taylor*, **1998** *Nucleic Acids Res.*, 26, 3300-3304..
 48. "The ability of a variety of polymerases to synthesize past site-specific cis-syn, trans-syn-II, (6-4), and Dewar photoproducts of thymidyl-(3'-5')-thymidine." Colin A. Smith, Jared Baeten, and John-Stephen Taylor*. **1998** *J. Biol. Chem.*, 273, 21933-21940.
 49. Thermodynamic and base-pairing studies of matched and mismatched DNA dodecamer duplexes containing cis-syn, (6-4) and Dewar photoproducts of TT. Yeuqing Jing, Jeffrey F.-L. Kao, and John-Stephen Taylor*, **1998** *Nucl. Acids. Res.*, 26, 3845-3853.
 50. Solution-state structure of a DNA dodecamer duplex containing a cis-syn thymine cyclobutane dimer, the major UV photoproduct of DNA. K. McAteer, Y. Jing, J. Kao, J-S. Taylor, M. A. Kennedy*, **1998** *J. Mol. Biol.*, 282, 1013-1032
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 56. Nuclease P1 Digestion Combined with Tandem Mass Spectrometry for the Structure Determination of the DNA Photoproducts. Yinsheng Wang, John-Stephen Taylor, and Michael L. Gross, **1999** *Chem. Res. Toxicol.*, 12, 1077-1082.
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- Gochin, M., Spicer, L. D., Lowry, D. F., and Kennedy, M. A. **1999** *Biochemistry* 38, 15116-15128.
58. A Caged Ligatable DNA Strand Break. Kaijiang Zhang and John-Stephen Taylor, **1999** *J. Am. Chem. Soc.* 121, 11579-11580.
59. "PhrA, the major photoreactivating factor in the cyanobacterium *Synechocystis* sp. strain PCC 6803 codes for a cyclobutane-pyrimidine-dimer-specific DNA photolyase" Ng WO, Zentella R, Wang Y, Taylor JS, Pakrasi* HB., **2000** *Arch Microbiol* 173, 412-7.
60. Replication Protein A Interactions with DNA. III. Molecular Basis of Recognition of Damaged DNA. Lao, Y., Gomes, X. V., Ren, Y., Taylor, J.-S., and Wold, M. S. **2000** *Biochemistry* 39, 850-859.
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63. Quantum Chemical Study of the Electron-Transfer-Catalyzed Splitting of Oxetane and Azetidine Intermediates Proposed in the Photoenzymatic Repair of (6-4) Photoproducts of DNA. Yinsheng Wang, Peter P. Gaspar, and John-Stephen Taylor* **2000** *J. Am. Chem. Soc.*, 5510-5519.
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GRANT SUPPORT:

Active

RO1 CA40463-17 (Taylor) 9/21/06- 7/31/11 15%

NIH \$207,500

DNA Photolesion Structure-Activity Relationships

The major goal of this project is to investigate the interaction of site-specific photoproduct-containing DNA with DNA polymerases by MS, NMR, and x-ray structural studies, in vitro replication studies, and in vivo mutagenesis studies.

1PO1CA104457-01, (Roti-Roti) 7/1/04-6/30/09 10%

NIH \$127,282 (sub)

Radiosensitization by the Cellular Stress Response

The major goal of my project is to synthesis antisense and antigene agents that will enhance the therapeutic outcome of heat sensitized radiation therapy by interfering with the heat and radiation response in cancer cells.

U01 HL080729-01 (Wooley)

5/1/05-4/30/10

8%

NIH/NHLBI Programs of Excellence

\$999,871

Integrated Nanosystems for Diagnosis & Therapy

The major goal of this project is the development of a group of well characterized & versatile nanoscale agents that can be assembled, labeled, targeted, filled & activated as needed for the combined purposes for diagnosis & treatment of various diseases of relevance to the NHLBI. There are 10 Co-PI's on this grant including UC-Berkeley and UC-Santa Barbara. Karen Wooley, Washington University, is the PI. My role is to design antisense imaging agents for disease-specific and gene therapy gene expression.