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Genome Integrity Structural Biology Laboratory
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HOME ADDRESS

5326 Yardley Terrace
Durham, NC 27707

EDUCATION

1971 B.A., Thomas More College (Biology)
1973 M.S., University of Cincinnati (Cell Biology)
1977 Ph.D., University of Cincinnati (Developmental Biology)

EMPLOYMENT

1971–1973 Teaching Assistant, University of Cincinnati
1973–1977 Research Assistant, University of Cincinnati
1977–1978 Research Associate, Institute for Cancer Research, Philadelphia
1978–1982 Postdoctoral Fellow, University of Washington
1982–1986 Senior Staff Fellow, NIEHS
1986–1989 GS14 Research Geneticist, Laboratory of Molecular Genetics, NIEHS
1989–1997 GS15 Research Geneticist, Laboratory of Molecular Genetics, NIEHS
1996–2000 Acting Chief, Laboratory of Structural Biology
1997–1998 NIH Senior Biomedical Research Service
1999–2011 Senior Investigator
1996–2011 Director, Environmental Biology Program, DIR, NIEHS
2000–2012 Chief, Laboratory of Structural Biology
2011–present NIH Distinguished Investigator

HONORS & AWARDS

1978–1981 NIH Postdoctoral Fellowship
1989 NIH Director's Award
1995 NIH Director's Award
1995 NIH G. Burroughs Mider Lectureship Award
1997 Environmental Mutagen Society Award for Basic Research
1998 Plenary Lecturer, Arnold Beckman Symposium, City of Hope, Duarte, CA
1998 Mutation Research Award for Basic Research
2003 Keynote Speaker, Midwest DNA Repair Symposium, Mayo Clinic
2003 NIEHS "Paper of the Year"

- 2003 Keynote Speaker, Gordon Research Conference on Genetic Toxicology
- 2005 NIEHS Scientist of the Year
- 2006 Keynote Speaker, Gordon Research Conference on Mutagenesis
- 2006 NIH Director's Award
- 2006 The Joseph Coleman Memorial Lecturer, Yale University
- 2006 NIEHS "Paper of the Year"
- 2007 "Doctor Honoris Causa" (Honorary Doctoral Degree), Umeå University
- 2008 Keynote Speaker, Workshop on AID Biology and Its Role in Human Disease
- 2008 Distinguished "Beach Lecturer", Purdue University
- 2008 NIEHS "Paper of the Year"
- 2009 Distinguished "Martin Lecturer", Mount Olive College
- 2009 The Cell and Developmental Biology Distinguished Speaker Award, Thomas Jefferson University
- 2009 Keynote Speaker, Biennial Sloan-Kettering Institute – London Research Institute of Cancer Research Conference on "Genome Integrity"
- 2009 Keynote Address, Second Erling Seeberg Symposium on DNA Repair, Ålesund-Geiranger, Norway
- 2009 Keynote Speaker, Gordon Research Conference on Nucleosides, Nucleotides & Oligonucleotides
- 2010 Keynote Speaker, International Conference on Radiation and Cancer Biology, Nagasaki
- 2010 Keynote Speaker, The 4th Baltimore Area Repair Symposium, Baltimore, MD
- 2011 Harris Lecture, Massachusetts Institute of Technology, Cambridge, MA
- 2011 Appointed NIH Distinguished Investigator
- 2011 Princess Takamatsu Cancer Research Fund Lectureship Award, Japan
- 2012 Elizabeth Olmsted Ross Keynote Address, Biochemistry Department Research Day, University of Buffalo
- 2012 Keynote Speaker, Gordon Research Conference on Mutagenesis
- 2013 Keynote Address, Graduate Research Day, University of Maryland Eastern Shore
- 2014 Plenary Lecture, Duke University Symposium to honor Barbara Shaw
- 2014 Plenary Lecture, Conference on "DNA Polymerases: Biology, Diseases and Biomedical Applications", Cambridge, UK
- 2014 Keynote Lecture, Fifth International Symposium on DNA Damage Response & Human Diseases, Beijing, China
- 2014 Elected to the American Academy of Arts & Sciences
- 2015 Plenary Lecture, International Conference on Yeast Genetics and Molecular Biology, Trento, Italy
- 2016 Keynote Speaker, Gordon Research Seminar on Mutagenesis, Girona, Spain
- 2016 Champion of Environmental Health Research Award, NIEHS, NIH

- 2017 Keynote Speaker, 3rd Oslo-London Cancer Network Meeting: Genome Stability and Instability in Cancer, Queen's College, Oxford, UK
- 2019 Keynote Speaker, Environmental Mutagenesis and Genomics Meeting, Washington, DC
- 2019 NIEHS "Paper of the Year"

UNIVERSITY AFFILIATIONS

- 1986 Adjunct Professor, Duke University Program in Genetics

EDITORIAL BOARDS

- 1988-1993 *The Journal of Biological Chemistry*
- 1994-1999 *The Journal of Biological Chemistry*
- 1994-1995 *Chemical Research in Toxicology*
- 2000-2005 *The Journal of Biological Chemistry*
- 1994-2012 *Environmental Health Perspectives*
- 2002-present *DNA Repair*
- 2011-present *EMBO Journal*

PROFESSIONAL SOCIETIES

- American Society for Biochemistry and Molecular Biology
- American Association for Cancer Research
- Environmental Mutagen Society
- American Chemical Society
- American Academy of Arts & Sciences

PROFESSIONAL AND PUBLIC SERVICE

- NIH Study Section, Chemical Pathology (ad hoc member, October, 1988)
- NIH Study Section on Radiation Biology (ad hoc member, October, 1989)
- American Association for Cancer Research Program Committee, 1989 Annual Meeting, Chairman, Biochemistry Section
- NIH Study Section on Biochemistry (ad hoc member, February, 1992)
- Advisory Committee for the Center for Environmental Health Sciences, Massachusetts Institute of Technology, 1992-1998
- State of California Tobacco-Related Disease Program Study Section on Cancer, (ad hoc member, March, 1991–April, 1992)
- Co-organizer of International Conference on Fidelity of DNA Synthesis: Structural and Mechanistic Perspectives, Beaufort, NC, 1989
- Vice Chairman, Gordon Research Conference on Mutagenesis, Plymouth, NH (1990)
- Chairman, Gordon Research Conference on Mutagenesis, Plymouth, NH (1992)

Co-organizer of International Conference on Fidelity of DNA Synthesis, Wrightsville Beach, NC, 1995

Member, Scientific Advisory Board for the Center for Environmental Health Sciences, Oregon State University, 1995-1998

American Association for Cancer Research Program Committee, 1996 Annual Meeting, Biochemistry Section

American Association for Cancer Research Program Committee, 1997 Annual Meeting, Molecular Biology and Biochemistry Section

Environmental Mutagen Society Program Committee, 1998 Annual Meeting

Environmental Mutagen Society Council Member, 1998 – 2000

Environmental Mutagen Society Program Committee, 1999 Annual Meeting

Vice-Chair, Gordon Research Conference on Genetic Toxicology, Oxford, UK (1999)

Environmental Mutagen Society Program Committee, 2000 Annual Meeting

Program Committee, University of North Carolina Lineberger Cancer Center – NIEHS Meeting on “Gene-Environment Interactions and Cancer Risk: The Role of DNA Repair”, Chapel Hill, NC, October, 2000

Environmental Mutagen Society Program Committee, 2001 Annual Meeting

Chair, Gordon Research Conference on Genetic Toxicology, New London, NH (2001)

Organizer, Symposium on “Structural Biology of Replication and Its Relevance to Mutation Research”, Eighth International Conference on Environmental Mutagens, Shizouka, Japan, October, 2001

Environmental Mutagen Society Program Committee, 2002 Annual Meeting

American Association for Cancer Research Program Committee, 2002 Annual Meeting, Member, Carcinogenesis Section

External Scientific Advisory Board for the Massachusetts Institute of Technology Center for Environmental Health Sciences, 2002

Program Committee Member, NCI-NIEHS-European Union Workshop entitled, "Molecular Signatures of DNA Damage Induced Stress Response", Cortona, Italy, September, 2003

External Scientific Review Committee for the International Agency for Cancer Research, Member, 2004

Program Committee, Environmental Mutagen Society, 2004 Annual Meeting

Program Committee, University of North Carolina at Chapel Hill Annual Symposium, entitled “Genomic Instability and Cancer”, Chapel Hill, North Carolina, May, 2005

Organizer, Eppley Institute for Cancer Research Annual Symposium entitled “DNA Damage Responses, Genome Stability and Cancer, May, 2005

Program Committee, Ninth International Conference on Environmental Mutagens, San Francisco, September, 2005

Member, Life Sciences Division External Scientific Review Committee, Lawrence Berkeley National Laboratory, 2005

Program Committee, Environmental Mutagen Society Annual Meeting, 2006

Program Committee, 2007 Annual Meeting of the American Association for Cancer Research Organizing Committee, North Carolina Regional Conference on “Determinants of Genome Stability and Human Disease”, Chapel Hill, NC, October, 2007

Chairperson, DNA Damage and Repair Subcommittee of the Cellular and Molecular Biology Section of the Program Committee, Annual Meeting of the American Association for Cancer Research, 2008

External Scientific Advisory Board for the Massachusetts Institute of Technology Center for Environmental Health Sciences, 2002-2009

Advisory Board, International Meeting entitled "DNA Repair and Mutagenesis: From Molecular Structure to Biological Consequences", Whistler, BC, Canada, May-June, 2009

Program Planning Committee Member and Co-organizer of Theme on DNA Transactions, Annual Meeting of the ASBMB, 2010 Anaheim, CA

Chairperson, Carcinogenesis: Chemical, Viral, and Radiation Subcommittee of the Carcinogenesis Section of the Program Committee, Annual Meeting of the American Association for Cancer Research, 2010

Co-Organizer, 6th United States – Japan DNA Repair Meeting, Berkeley, California, 2017

NIH/NIEHS SERVICE

NIEHS Scientific Director’s Frontiers in Science Spring Minisymposium
Organizer of Inaugural Symposium, 1989

NIEHS Distinguished Lecture Series Committee, Member, 1987-1995, Chair, 1990-95

NIEHS Committee on Promotions and Tenure, Member, 1989-1996, Chair, 1994-1996

NIEHS Search Committee for DIR Scientific Director, Member, 1994

NIEHS Executive Committee, Member, 1994-present

NIEHS/UNC/Duke U. Clinical Program Training Advisory Board, Member, 1994-1996

NIH Central Tenure Committee, Member, 1994-96

NIEHS/DIR Search Committee for X-ray Crystallographer, Member, 1996-1997

NIEHS Committee to Review Epidemiology Branch, Member, 1997

NIEHS Concepts Forum, Member, 1996-present

NIEHS Frontiers in Science Spring Minisymposium, Organizer, 1997

NIEHS Research Triangle Partnership Committee, Member, 1997

NIEHS Environmental Genome Project Planning & Implementation Committee, Member, 1997 – 1999

NIEHS Senior Mentor for Tenure-Track Investigators Assembly, 1999-present

NIEHS/DIR Search Committee for Collaborative Mass Spectrometrist, Member, 1999

NIEHS/DIR Search Committee for Staff Scientist for NMR Group, Member, 1999

NIEHS Search Committee for DIR Scientific Director, Member, 2000

NIEHS Coordination Panel for Natl. Center for Toxicogenomics, Member, 2000 – 06

NIEHS/DIR Review Committee for Microarray Proposals, Member, 2000 – 2006

NIEHS/DIR Search Committee for Director, Environmental Toxicology Program, Member, 2000. Representing the Deputy Director for Intramural Research, NIH

NIEHS/DIR Search Committee for Principle Investigator, LSB, Member, 2001
NIEHS/DIR Search Committee for Principle Investigator, Laboratory of Molecular Genetics, Member, 2001. Representing the DDIR, NIH
NIEHS/DIR Search Committee for Chief, LMC, Chair, 2002
NIEHS/DIR Search Committee for Collaborative Mass Spectrometrists, Member, 2002
NIEHS/DIR Search Committee for Deputy Director, Division of Intramural Research, Member, 2002. Representing the Deputy Director for Intramural Research, NIH
NIEHS/DIR Search Committee for Leader, Protein Expression Core, Member, 2002
NIEHS T42 Standing Committee, Member, 2002-present
NIEHS Workshop on “Gene-Environment Interactions and Human Health”, Dallas, TX, October, 2002
NIEHS/DIR Search Committee for Staff Scientist for Transmembrane Signaling Group, Laboratory of Signal Transduction, Chair, 2003
NIEHS/DIR Search Committee for Independent Investigator in Bioinformatics, Biostatistics Brach, Member, 2003
NIEHS/DIR Search Committee for Collaborative Mass Spectrometrists, Member, 2004
NIEHS Committee on Promotions for Staff Scientists (COP IV), Member, 2004-2006
NIEHS/DIR Search Committee for Independent Investigator in Laboratory of Molecular Carcinogenesis, Chair, 2004-2005
NIEHS/DIR Search Committee for Staff Scientist for Computational Chemistry Group, Member, 2004-2005
NIEHS/DIR Search Committee for Staff Scientist for Nucleic Acids Enzymology Group, Member, 2005
NIEHS Strategic Plan Workgroup, Member, 2005
NIEHS Working Group on Integrated Translational Research on DNA Repair, Member, 2006
NIEHS Education and Training Committee, Member 2006 – present.
NIEHS/DIR Search Committee for Clinical Scientists, Member, 2006-07
NIEHS/DIR Search Committee for Director, National Toxicology Program, Member and DDIR Representative, 2006-07
NIEHS Search Committee for DIR Scientific Director, Member, 2007
NIEHS/DIR Search Committee for Investigators in Bioinformatics, Chair, 2007-08
NIEHS/NIH Ethics Response Working Group, Member, 2008
NIEHS Implementation Review Committee, Member, August 2008- 2010
NIEHS/DIR Search Committee for Investigator in Structural Biology, 2008-09
NIEHS/DIR IRA Review Committee, 2009-10
NIEHS Search Committee for DIR Scientific Director, Member, 2009-10
NIH Search Committee for Earl Stadtman Investigator in Structural Biology, 2010-11
NIEHS Tenure Track Review Committee, 2011 – present
NIEHS Committee for Strategic Planning and DIR Retreat Organization, 2011-12
NIEHS Search Committee for New Investigators, Member, 2013-15
NIH Search Committee for Earl Stadtman Investigator in Structural Biology, 2013-14

NIEHS Division of Intramural Research IRP Review Committee, 2014

NIEHS Search Committee for Director of the Center for Integrative Bioinformatics, 2016

NIEHS Search Committee for Deputy Director, DIR, 2016 (Chair)

NIEHS Search Committee for Principle Investigator in ESCBL, DIR, 2017- 2018 (Chair)

NIEHS Search Committee for Staff Scientist in GISBL, DIR 2018-2019

NIEHS Search Committee for Staff Scientist in ESCBL, DIR, 2018- 2019

BIBLIOGRAPHY

1. Mosbaugh, D.W., Kunkel, T.A., Stalker, D.M., Tchong, J.E. and Meyer, R.R. (1976) Novikoff hepatoma deoxyribonucleic acid polymerase: sensitivity of the β -polymerase to sulfhydryl blocking agents. *Nucleic Acids Res.* **3**, 2341-2352
2. Kunkel, T.A., Tchong, J.E. and Meyer, R.R. (1978) Purification and properties of DNA polymerase- β from guinea pig liver. *Biochim. Biophys. Acta* **520**, 302-316
3. Loeb, L.A., Weymouth, L.A., Kunkel, T.A., Gopinathan, K.P., Beckman, R.A. and Dube, D.K. (1978) On the fidelity of DNA replication. *Cold Spring Harbor Symp. Quant. Biol.* **43**, 921-927
4. Loeb, L.A., Weymouth, L.A., Gopinathan, K.P. and Kunkel, T.A. (1978) On the fidelity of DNA replication. In: *Cell Reproduction*, ICN-UCLA Symposium, Academic Press, pp. 47-60.
5. Dube, D.K., Kunkel, T.A., Seal, G. and Loeb, L.A. (1979) Distinctive properties of mammalian DNA polymerases. *Biochim. Biophys. Acta* **561**, 369-382.
5. Gopinathan, K.P., Weymouth, L.A., Kunkel, T.A. and Loeb, L.A. (1979) On the fidelity of DNA replication: Mutagenesis *in vitro* by DNA polymerase from an RNA tumor virus. *Nature* **278**, 857-859.
6. Kunkel, T.A. and Loeb, L.A. (1979) On the fidelity of DNA replication. Effect of divalent metal ion activators and deoxyribonucleoside triphosphate pools on *in vitro* mutagenesis. *J. Biol. Chem.* **254**, 5718-5725.
7. Kunkel, T.A., Meyer, R.R. and Loeb, L.A. (1979) Single-strand binding protein enhances fidelity of DNA synthesis *in vitro*. *Proc. Natl. Acad. Sci. USA* **76**, 6331-6335.
8. Zakour, R.A., Loeb, L.A., Kunkel, T.A. and Koplitz, R.M. (1979) Metals, DNA polymerization and genetic miscoding. In: *Trace Metals in Health and Disease* (ed. N. Kharasch). Raven Press, New York, pp. 135-153.
9. Kunkel, T.A. and Loeb, L.A. (1980) On the fidelity of DNA replication: the accuracy of *Escherichia coli* DNA polymerase I in copying natural DNA *in vitro*. *J. Biol. Chem.* **255**, 9961-9966.
10. Loeb, L.A., Kunkel, T.A. and Schaaper, R.M. (1980) Fidelity of copying natural DNA templates. In: *Mechanistic Studies of DNA Replication and Genetic Recombination*, ICN-UCLA Symposium, Academic Press, NY, pp. 735-751.
11. Kunkel, T.A., Shearman, C.W. and Loeb, L.A. (1981) Mutagenesis *in vitro* by depurination of ϕ X174 DNA. *Nature* **291**, 349-351.

12. Kunkel, T.A. and Loeb, L.A. (1981) The fidelity of mammalian DNA polymerases. *Science* **213**, 765-767
13. Kunkel, T.A., Schaaper, R.M., Beckman, R.A. and Loeb, L.A. (1981) On the fidelity of DNA replication: effect of next nucleotide on proofreading. *J. Biol. Chem.* **256**, 9883-9889
14. Kunkel, T.A., Eckstein, F., Mildvan, A.S., Koplitz, R.M. and Loeb, L.A. (1981) Deoxynucleoside thiotriphosphates prevent proofreading during *in vitro* DNA synthesis. *Proc. Natl. Acad. Sci. USA* **78**, 6434-6438
15. Zakour, R.A., Kunkel, T.A. and Loeb, L.A. (1981) Metal induced infidelity of DNA synthesis. *Environ. Health Perspec.* **40**, 197-205.
16. Loeb, L.A. and Kunkel, T.A. (1982) Fidelity of DNA synthesis. *Annu. Rev. Biochem.* **52**, 429-457.
17. Kunkel, T.A., Silber, J.R. and Loeb, L.A. (1982) The mutagenic effect of deoxynucleotide substrate imbalances during DNA synthesis with mammalian DNA polymerases. *Mutat. Res.* **94**, 413-419.
18. Kunkel, T.A., James, E. and Loeb, L.A. (1982) The use of ØX174 amber mutations for studying the fidelity of DNA polymerases. In: *DNA Repair: A Laboratory Manual of Research Procedures* (eds. E. Friedberg and P. Hanawalt) **2**, 223-237.
19. Schaaper, R.M., Kunkel, T.A. and Loeb, L.A. (1982) Depurination of DNA as a possible mutagenic pathway for cells. In: *Molecular and Cellular Mechanisms of Mutagenesis* (eds. J.F. Lemontt and W.M. Generoso). Plenum Press, New York, pp. 199-211.
20. Schaaper, R.M., Kunkel, T.A. and Loeb, L.A. (1983) Infidelity of DNA synthesis associated with bypass of apurinic sites. *Proc. Natl. Acad. Sci. USA* **80**, 487-491.
21. Kunkel, T.A., Schaaper, R.M. and Loeb, L.A. (1983) Depurination-induced infidelity of DNA synthesis with purified DNA replication proteins *in vitro*. *Biochemistry* **22**, 2378-2384.
22. Kunkel, T.A., Schaaper, R.M., James, E. and Loeb, L.A. (1983) Depurination of DNA as a possible mutagenic pathway in cells. In: *Induced Mutagenesis: Molecular Mechanisms and Their Implications for Environmental Protection* (eds. A. Hollander and W. Lawrence). Plenum Press, New York, pp. 63-82.
23. Kunkel, T.A., Goodman, M.F. and Loeb, L.A. (1984) On the fidelity of DNA replication. The accuracy of T4 DNA polymerases in copying ØX174 DNA *in vitro*. *J. Biol. Chem.* **259**, 1539-1545.
24. Kunkel, T.A. (1984) The mutational specificity of depurination. *Proc. Natl. Acad. Sci. USA* **81**, 1494-1498.
25. Kunkel, T.A. (1985) Rapid and efficient site-specific mutagenesis without phenotypic selection. *Proc. Natl. Acad. Sci. USA* **82**, 488-492.
26. Kunkel, T.A. (1985) The mutational specificity of DNA polymerase- β during *in vitro* DNA synthesis. Production of frameshift, base substitution and deletion mutations. *J. Biol. Chem.* **260**, 5787-5796.

27. Kunkel, T.A. (1985) The mutational specificity of DNA polymerases α and γ during *in vitro* DNA synthesis. *J. Biol. Chem.* **260**, 12866-12874.
28. Das, S., Kunkel, T.A. and Loeb, L.A. (1985) Effects of altered nucleotide concentrations on the fidelity of DNA replication. In: *Genetic Consequences of Nucleotide Pool Imbalances* (ed. F.J. de Serres). Plenum Press, New York, pp. 117-126.
29. Kunkel, T.A. and Alexander, P.S. (1986) The base substitution fidelity of eucaryotic DNA polymerases. Mispairing frequencies, site preferences, insertion preferences and base substitution by "dislocation". *J. Biol. Chem.* **261**, 160-166.
30. Kunkel, T.A., Gopinathan, K.P., Dube, D.K., Snow, E.T. and Loeb, L.A. (1986) Rearrangements of DNA mediated by terminal transferase. *Proc. Natl. Acad. Sci. USA* **83**, 1867-1871.
31. Kunkel, T.A. and Roberts, J.D. (1986) The mutational specificity of animal cell DNA polymerases *in vitro*. *Environ. Mutagen.* **8**, 769-789.
32. Kunkel, T.A. (1986) Frameshift mutagenesis by eucaryotic DNA polymerases *in vitro*. *J. Biol. Chem.* **261**, 13581-13587.
33. Kunkel, T.A., Beckman, R.A. and Loeb, L.A. (1986) On the fidelity of DNA synthesis. Pyrophosphate-induced misincorporation allows detection of two proofreading mechanisms. *J. Biol. Chem.* **261**, 13610-13616.
34. Thomas, D.C., Kunkel, T.A., Casna, N.J., Ford, J.P. and Sancar, A. (1986) Activities and incision patterns of ABC excinulcease on modified DNA containing single-base mismatches and extrahelical bases. *J. Biol. Chem.* **261**, 14496-14505.
35. Kunkel, T.A., Alexander, P.S., Liu, J.C. and Motto-Fox, J. (1986) Mutagenesis *in vitro* by DNA polymerases α , β and γ . In: *Genetic Toxicology of Environmental Chemicals. Part A: Basic Principles and Mechanisms of Action*. Alan R. Liss, New York.,pp. 441-447.
36. Kunkel, T.A., Roberts, J. D. and Zakour, R.A. (1987) Rapid and efficient site specific mutagenesis without phenotypic selection. In: *Methods in Enzymology, Recombinant DNA, Part E*, **154**, 367-382 and (at the publisher's request) In: *Recombinant DNA Methodology* (eds. R. Wu, L. Grossman and K. Moldave). Academic Press, New York, pp. 587-602 (1989).
37. Kunkel, T.A. (1987) *In vitro* mutagenesis without phenotypic selection. In: *Current Protocols in Molecular Biology* (eds. F. Ausubel, R. Brent, R. Kingston, D. Moore, J.A. Smith, J. Seidman and K. Struhl). Greene Publishing Associates, New York, pp. 8.1.1-8.1.5.
38. Kunkel, T.A., Sabatino, R.D. and Bambara, R.A. (1987) Exonucleolytic proofreading by calf thymus DNA polymerase δ . *Proc. Natl. Acad. Sci. USA* **84**, 4865-4869.
39. Ebright, R.H., Kolb, A., Buc, H., Kunkel, T.A., Krakow, J.S. and Beckwith, J. (1987) Role of glutamic acid-181 in DNA-sequence recognition by the catabolite gene activator protein (CAP) of *Escherichia coli*: Altered DNA-sequence-recognition properties of [Val¹⁸¹]CAP and [Leu¹⁸¹]CAP. *Proc. Natl. Acad. Sci. USA* **84**, 6083-6087.

40. Snow, E.T., Kunkel, T.A. and Loeb, L.A. (1987) Base substitution mutagenesis by terminal transferase: its role in somatic mutagenesis. *Mutat. Res.* **180**, 137-146.
41. Kunkel, T.A. and Soni, A. (1988) Exonucleolytic proofreading enhances the fidelity of DNA synthesis by chick embryo DNA polymerase- γ . *J. Biol. Chem.* **263**, 4450-4459.
42. Lindberg, G., Rist, J.K., Kunkel, T.A., Sugino, A. and Rothman-Denes, R.B. (1988) Purification and characterization of bacteriophage N4-induced DNA polymerase. *J. Biol. Chem.* **263**, 11319-11326.
43. Kunkel, T.A. (1988) Exonucleolytic proofreading. *Cell* **53**, 837-840.
44. Tindall, K.R. and Kunkel, T.A. (1988) Fidelity of DNA synthesis by the *Thermus aquaticus* DNA polymerase. *Biochemistry* **27**, 6008-6013.
45. Roberts, J.D. and Kunkel, T.A. (1988) Fidelity of a human cell DNA replication complex. *Proc. Natl. Acad. Sci. USA* **85**, 7064-7068.
46. Kunkel, T.A. and Bebenek, K. (1988) Recent studies of the fidelity of DNA synthesis. *Biochim. Biophys. Acta* **951**, 1-15.
47. Kunkel, T.A. and Soni, A. (1988) Mutagenesis by transient misalignment. *J. Biol. Chem.* **263**, 14784-14789.
48. Roberts, J.D., Bebenek, K. and Kunkel, T.A. (1988) The accuracy of reverse transcriptase from HIV-1. *Science* **242**, 1171-1173.
49. Kunkel, T.A. (1988) The efficiency of oligonucleotide-directed mutagenesis. In: *Nucleic Acids & Molecular Biology* **2**, 124-135.
50. Kunkel, T.A., Bambara, R.A., Bebenek, K., Roberts, J.D., Sabatino, R.D., Smith, M.P. and Soni, A. (1988) Analysis of mutational mechanisms with eukaryotic DNA polymerases. In: *Mechanisms and Consequences of DNA Damage Processing*. UCLA Symp. Mol. Cell. Biol., New Series **83**, 521-528.
51. Roberts, J.D. and Kunkel, T.A. (1988) Fidelity of DNA synthesis by human cell extracts during *in vitro* replication from the SV40 origin. In: *DNA Replication and Mutagenesis* (eds. R.E. Moses and W.C. Summers), American Society for Microbiology, Washington D.C., pp. 182-192.
52. Kunkel, T.A. and Eckert, K.A. (1989) Fidelity of DNA polymerases used in polymerase chain reactions. In: *Current Communications in Molecular Biology: Polymerase Chain Reactions*, Cold Spring Harbor Laboratory, NY, pp. 1-6.
53. Kunkel, T.A. and Mosbaugh, D.W. (1989) Exonucleolytic proofreading by a mammalian DNA polymerase gamma. *Biochemistry* **28**, 988-995.
54. Roberts, J.D., Preston, B.D., Johnson, L.A., Soni, A., Loeb, L.A. and Kunkel, T.A. (1989) Fidelity of two retroviral reverse transcriptases during DNA-dependent DNA synthesis *in vitro*. *Mol. Cell. Biol.* **9**, 469-476.
55. Kunkel, T.A., Bebenek, K., Roberts, J.D., Smith, M.P. and Thomas, D.C. (1989) Analysis of fidelity mechanisms with eukaryotic DNA replication and repair proteins. *Genome* **31**, 100-103.

56. Boosalis, M.S., Mosbaugh, D.W., Hamatake, R., Sugino, A.S., Kunkel, T.A. and Goodman, M.F. (1989) Kinetic analysis of base substitution mutagenesis by transient misalignment of DNA and by miscoding. *J. Biol. Chem.* **264**, 11360-11366.
57. Bebenek, K. and Kunkel, T.A. (1989) The use of native T7 DNA polymerase for site-directed mutagenesis. *Nucleic Acids Res.* **17**, 5408.
58. Kunkel, T.A., Hamatake, R.K., Motto-Fox, J., Fitzgerald, M.P. and Sugino, A. (1989) The fidelity of DNA polymerase I and the DNA polymerase I-DNA primase complex from *Saccharomyces cerevisiae*. *Mol. Cell. Biol.* **9**, 4447-4458.
59. Bebenek, K., Abbotts, J., Roberts, J.D., Wilson, S.H. and Kunkel, T.A. (1989) Specificity and mechanism of error-prone replication by HIV-1 reverse transcriptase. *J. Biol. Chem.* **264**, 16948-16956.
60. Hamatake, R.H., Hasegawa, H., Clark, A.B., Bebenek, K., Kunkel, T.A. and Sugino, A. (1990) Purification and characterization of DNA polymerase II from the yeast *Saccharomyces cerevisiae*: Identification of the catalytic core and a possible holoenzyme form of the enzyme. *J. Biol. Chem.* **265**, 4072-4083.
61. Frederico, L.A., Kunkel, T.A. and Shaw, B.R. (1990) A sensitive genetic assay for the detection of cytosine deamination: determination of rate constants and the activation energy. *Biochemistry* **29**, 2532-2537.
62. Bebenek, K. and Kunkel, T.A. (1990) Frameshift errors initiated by nucleotide misincorporation. *Proc. Natl. Acad. Sci. USA* **87**, 4946-4950.
63. Kunkel, T.A. (1990) Misalignment-mediated DNA synthesis errors. *Biochemistry* **29**, 8003-8011.
64. Ebright, R.H., Gunasekera, A., Zhang, X., Kunkel, T.A. and Krakow, J.S. (1990) Lysine 188 of the gene activator protein (CAP) plays no role in specificity at base pair 7 of the DNA half site. *Nucleic Acids Res.* **18**, 1457-1464.
65. Bebenek, K., Joyce, C.M., Fitzgerald, M.P. and Kunkel, T.A. (1990) The fidelity of DNA synthesis catalyzed by derivatives of *Escherichia coli* DNA polymerase I. *J. Biol. Chem.* **265**, 13878-13887.
66. Eckert, K.A. and Kunkel, T.A. (1990) High fidelity DNA synthesis by *Thermus aquaticus* DNA polymerase. *Nucleic Acids Res.* **18**, 3739-3744.
67. Roberts, J.D., Hamatake, R.K., Fitzgerald, M.S., Sugino, A. and Kunkel, T.A. (1990) Effect of accessory proteins on the fidelity of DNA synthesis by eukaryotic replicative polymerases. In: *Progress in Clinical and Biological Research. Mutation and the Environment, Part A: Basic Mechanisms*. **340A**, 91-100.
68. Thomas, D.C., Roberts, J.D., Fitzgerald, M.P. and Kunkel, T.A. (1990) Fidelity of animal cell DNA polymerases α and δ and of a human DNA replication complex. In: *Antimutagenesis and Anticarcinogenesis Mechanisms, Vol. II* (eds. Y. Kuroda, D.M. Shankel and M.D. Waters). Plenum, New York, pp. 289-297.

69. Eckert, K.A. and Kunkel, T.A. (1991) The fidelity of DNA polymerases used in the polymerase chain reaction. In: *PCR I: A Practical Approach* (eds. M.J. McPherson, P. Quirke and G. R. Taylor), IRL Press, Oxford, pp. 225-244.
70. Kunkel, T.A. (1991) Hypermutation during DNA synthesis *in vitro*. In: *Somatic Hypermutation in V-Regions* (ed. E.J. Steele). CRC Press, Boca Raton, Fla., pp. 159-178.
71. Kunkel, T.A., K. Bebenek and McClary, J. (1991) Efficient site-directed mutagenesis using uracil-containing DNA. In: *Bacterial Genetic Systems, Meth. Enzymol.* **204**, 125-139.
72. Thomas, D.C., Roberts, J.D. and Kunkel, T.A. (1991) Heteroduplex repair in extracts of human HeLa cells. *J. Biol. Chem.* **266**, 3744-3751.
73. Roberts, J.D., Thomas, D.C. and Kunkel, T.A. (1991) Exonucleolytic proofreading of leading and lagging strand DNA replication errors. *Proc. Natl. Acad. Sci. USA* **88**, 3465-3469.
74. Kunkel, T.A., Roberts, J.D. and Sugino, A. (1991) The fidelity of DNA synthesis by the catalytic subunit of yeast DNA polymerase α alone and with accessory proteins. *Mutat. Res.* **250**, 175-182.
75. Eckert, K.A. and Kunkel, T.A. (1991) DNA polymerase fidelity and the polymerase chain reaction. *PCR Methods and Applications* **1**, 17-24.
76. Morrison, A., Bell, J.B., Kunkel, T.A. and Sugino, A. (1991) Eukaryotic DNA polymerase amino acid sequence required for 3'→5' exonuclease activity. *Proc. Natl. Acad. Sci. USA* **88**, 9473-9477.
77. Thomas, D.C., Roberts, J.D., Sabatino, R.D., Myers, T.W., Tan, C-K, Downey, K.M., So, A.G., Bambara, R.A. and Kunkel, T.A. (1991) Fidelity of mammalian DNA replication and replicative DNA polymerases. *Biochemistry* **30**, 11751-11759.
78. Kunkel, T.A. (1992) Biological asymmetries and the fidelity of eukaryotic DNA replication. *BioEssays* **14**, 303-308.
79. Bebenek, K., Roberts, J.D. and Kunkel, T.A. (1992) The effects of dNTP pool imbalances on the frameshift fidelity of replicative DNA polymerases. *J. Biol. Chem.* **267**, 3589-3596.
80. Lacey, S. F., Reardon, J.E., Furfine, E.S., Kunkel, T.A., Bebenek, K., Eckert, K.A., Kemp, S.D. and Larder, B.A. (1992) Biochemical studies of the reverse transcriptase and RNase H activities from HIV-1 strains resistant to 3'-azido-3'-deoxythymidine. *J. Biol. Chem.* **267**, 15789-15794.
81. Boyer, J. C., Bebenek, K. and Kunkel, T.A. (1992) Unequal human immunodeficiency virus type 1 reverse transcriptase error rates with RNA and DNA templates. *Proc. Natl. Acad. Sci. USA* **89**, 6919-6923.
82. Kunkel, T.A. (1992) DNA replication fidelity. *J. Biol. Chem.* **267**, 18251-18254.
83. Kunkel, T.A., Roberts, J.D., Thomas, D.C. and Nguyen, D.C. (1992) The "fine structure" of DNA replication fidelity. In: *DNA Repair Mechanisms. Alfred Benzon Symp.* **35**, 189-199.

84. Bebenek, K. and Kunkel, T.A. (1993) The fidelity of retroviral reverse transcriptases. In: *Reverse Transcriptase* (eds. S.P. Goff and A.M. Skalka). Cold Spring Harbor Laboratories, Cold Spring Harbor, New York, pp 85-102.
85. Roberts, J.D. and Kunkel, T.A. (1993) Fidelity of DNA replication in human cells. In: *Chromosomes and Gene Analysis, Meth. Molec. Genetics* **2**, 295-313.
86. Bebenek, K., Thomas, D.C., Roberts, J.D., Eckstein, F. and Kunkel, T.A. (1993) The effects of 3'-azido-3'-deoxythymidine metabolites on SV40 origin-dependent replication and heteroduplex repair in HeLa cell extracts. *Molecular Pharmacology* **43**, 57-63.
87. Roberts, J.D., Nguyen, D. and Kunkel, T.A. (1993) Frameshift fidelity during replication of double-stranded DNA in HeLa cell extracts. *Biochemistry*, **32**, 4083-4089.
88. Abbotts, J., Bebenek, K., Kunkel, T.A. and Wilson, S.H. (1993) Mechanism of HIV-1 reverse transcriptase: Termination of processive synthesis on a natural DNA template is influenced by the sequence of the template•primer stem. *J. Biol. Chem.* **268**, 10312-10323.
89. Bebenek, K., Abbotts, J., Wilson, S.H., and Kunkel, T.A. (1993) Error-prone polymerization by HIV-1 reverse transcriptase: Contribution of template-primer misalignment, miscoding and termination probability to mutational hot spots. *J. Biol. Chem.* **268**, 10324-10334.
90. Eckert, K.A. and Kunkel, T.A. (1993) Effect of reaction pH on the fidelity and processivity of exonuclease-deficient Klenow polymerase. *J. Biol. Chem.* **268**, 13462-13471.
91. Boyer, J.C., Thomas, D.C., Maher, V.M., McCormick, J.J. and Kunkel, T.A. (1993) Fidelity of DNA replication by extracts of normal and malignantly transformed human cells. *Cancer Res.* **53**, 1-6.
92. Frederico, L.A., Kunkel, T.A. and Shaw, B.S. (1993) Cytosine deamination in mismatched base pairs. *Biochemistry* **32**, 6523-6530.
93. Thomas, D.C. and Kunkel, T.A. (1993) Replication of UV-irradiated DNA in human cell extracts: Evidence for mutagenic bypass of pyrimidine dimers. *Proc. Natl. Acad. Sci. USA* **90**, 7744-7748.
94. Eckert, K.A. and Kunkel, T.A. (1993) Fidelity of DNA synthesis catalyzed by human DNA polymerase α and HIV-1 reverse transcriptase: Effect of reaction pH. *Nucl. Acids Res.* **21**, 5212-5220.
95. Thomas, D.C., Nguyen, D.C., Piegorsch, W.W. and Kunkel, T.A. (1993) Relative probability of mutagenic translesion synthesis on the leading and lagging strands during replication of UV-irradiated DNA in a human cell extract. *Biochemistry* **32**, 11476-11482.
96. Kunkel, T.A. (1993) Slippery DNA and diseases. *Nature* **365**, 207-208.
97. Goel, R., Beard, W.A., Kumar, A., Casas-Finet, J.R., Strub, M.-P., Stahl, S.J., Lewis, M.S., Bebenek, K., Becerra, S.P., Kunkel, T.A. and Wilson, S.H. (1993)

- Structure/function studies of HIV-1 reverse transcriptase: Dimerization-defective mutant L289K. *Biochemistry* **32**, 13012-13018.
98. Roberts, J.D., Izuta, S., Thomas, D.C. and Kunkel, T.A. (1994) Mismatch-, site-, and strand-specific error rates during SV40 origin-dependent replication *in vitro* with excess deoxythymidine triphosphate. *J. Biol. Chem.* **269**, 1711-1717.
 99. Pavlov, Y.I., Minnick, D.T., Izuta, S. and Kunkel, T.A. (1994) DNA replication fidelity with 8-oxo-deoxyguanosine triphosphate. *Biochemistry* **33**, 4695-4701.
 100. Torri, A.F., Kunkel, T.A., and Englund, P.T. (1994) A β -like DNA polymerase from the mitochondrion of the trypanosomatid *Crithidia fasciculata*. *J. Biol. Chem.* **269**, 8165-8171.
 101. Umar, A., Boyer, J.C., Thomas, D.C., Nguyen, D.C., Risinger, J.I., Boyd, J., Ionov, J., Perucho, M. and Kunkel, T.A. (1994) Defective mismatch repair in extracts of colorectal and endometrial cancer cell lines exhibiting microsatellite instability. *J. Biol. Chem.* **269**, 14367-14370.
 102. Kunkel, T.A., Patel, S. and Johnson, K.A. (1994) Error-prone replication of repeated DNA sequences by T7 DNA polymerase in the absence of its processivity subunit. *Proc. Natl. Acad. Sci. USA* **91**, 6830-6834.
 103. Thomas, D.C., Veaute, X., Kunkel, T.A. and Fuchs, R.P.P. (1994) Mutagenic replication in human cell extracts of DNA containing site-specific N-2-acetylaminofluorene adducts. *Proc. Natl. Acad. Sci. USA* **91**, 7752-7756.
 104. Koi, M., Umar, A., Chauhan, D.P., Cherian, S.P., Carethers, J.M., Kunkel, T.A. and Boland, C.R. (1994) Human chromosome 3 corrects mismatch repair deficiency and microsatellite instability and reduces N-methyl-N-nitrosoguanidine-tolerance in colon tumor cells with a homozygous hMLH1 mutation. *Cancer Res.* **54**, 4308-4312.
 105. Kunz, B.A., Kohalmi, S.E., Kunkel, T.A., Mathews, C.K., McIntosh, E.M. and Reidy, J.A. (1994) Deoxyribonucleotide triphosphate levels: A critical factor in the maintenance of genetic stability. *Mutat. Res.* **318**, 1-64.
 106. Umar, A., Boyer, J.C. and Kunkel, T.A. (1994) DNA loop repair by human cell extracts. *Science* **266**, 814-816.
 107. Beard, W.A., Stahl, S.J., Kim, H.-R., Bebenek, K., Kumar, A., Strub, M.-P., Becerra, S.P., Kunkel, T.A. and Wilson, S.H. (1994) Structure/function studies of HIV-1 reverse transcriptase: Alanine scanning mutagenesis of an α -helix in the thumb subdomain. *J. Biol. Chem.* **269**, 28091-28097.
 108. Minnick, D.T., Pavlov, Y.I. and Kunkel, T.A. (1995) The fidelity of the human leading and lagging strand DNA replication apparatus with 8-oxodeoxyguanosine triphosphate. *Nucleic Acids Res.* **22**, 5658-5664.
 109. Izuta, S., Roberts, J.D. and Kunkel, T.A. (1995) Replication error rates for T•dGTP, G•dGTP and A•dGTP mispairs: Evidence for differential proofreading by leading and lagging strand DNA replication complexes in human cells. *J. Biol. Chem.* **270**, 2595-2600.

110. Cai, H., Yu, H., McEntee, K., Kunkel, T.A. and Goodman, M.F. (1995) Purification and properties of wild type and exonuclease-deficient DNA polymerase II from *Escherichia coli*. *J. Biol. Chem.* **270**, 15327-15335.
111. Bebenek, K., Beard, W.A., Casas-Finet, J.R., Kim, H.-R., Darden, T.A., Wilson, S.H. and Kunkel, T.A. (1995) Reduced frameshift fidelity and processivity of HIV-1 reverse transcriptase mutants containing alanine substitutions in helix H of the thumb subdomain. *J. Biol. Chem.* **270**, 19516-19523.
112. Risinger, J.R., Umar, A., Barrett, J.C. and Kunkel, T.A. (1995) A *hPMS2* mutant cell line is defective in strand-specific mismatch repair. *J. Biol. Chem.* **270**, 18183-18186.
113. Thomas, D.C., Veaute, X., Fuchs, R.P.P. and Kunkel, T.A. (1995) Frequency and fidelity of translesion synthesis of site-specific N-2-acetylaminofluorene adducts during DNA replication in a human cell extract. *J. Biol. Chem.* **270**, 21226-21233.
114. Hawn, M.T., Umar, A., Carethers, J.M., Marra, G., Kunkel, T.A., Boland, C.R. and Koi, M. (1995) Evidence for a connection between the mismatch repair system and the G2 cell cycle checkpoint. *Cancer Res.* **55**, 3721-3725.
115. Kunkel, T.A. (1995) The intricacies of eukaryotic spellchecking. *Current Biology* **5**, 1091-1094.
116. Risinger, J.R., Umar, A., Boyer, J.C., Evans, A.C., Berchuck, A., Kunkel, T.A. and Barrett, J.C. (1995) Microsatellite instability in gynecological sarcomas and in *hMSH2* mutant uterine sarcoma cell lines defective in mismatch repair activity. *Cancer Res.* **55**, 5664-5669.
117. Boyer, J.C., Umar, A., Risinger, J.I., Lipford, R., Kane, M., Yin, S., Barrett, J.C., Kolodner, R.D. and Kunkel, T.A. (1995) Microsatellite instability, mismatch repair deficiency and genetic defects in human cancer cell lines. *Cancer Res.* **55**, 6063-6070.
118. Thomas, D. C., Umar, A. and Kunkel, T. A. (1995) Measurement of heteroduplex repair in human cell extracts. *METHODS: A Companion to Methods in Enzymology* **7**, 187-197. (ed. E. C. Friedberg) Academic Press.
119. Bebenek, K. and Kunkel, T.A. (1995) Analyzing the fidelity of DNA polymerases. *Meth. Enzymol.* **262**, 217-232.
120. Boyer, J.C., Bebenek, K. and Kunkel, T.A. (1996) Analyzing the fidelity of reverse transcription and transcription. *Meth. Enzymol.* **275**, 523 - 537.
121. Thomas, D.C., Umar, A. and Kunkel, T.A. (1996) Microsatellite instability and mismatch repair defects in cancer cells. *Mutat. Res.* **350**, 201-205.
122. Kroutil, L.C., Register, K., Bebenek, K. and Kunkel, T.A. (1996) Exonucleolytic proofreading during replication of repetitive DNA. *Biochemistry* **35**, 1046-1053.
123. Beard, W.A., Minnick, D.T., Wade, C., Prasad, R., Won, R.L., Kumar, A., Kunkel, T.A. and Wilson, S.H. (1996) Role of the "helix clamp" in HIV-1 reverse transcriptase catalytic cycling as revealed by alanine-scanning mutagenesis. *J. Biol. Chem.* **271**, 12213-12220.

124. Beard, W.A., Osheroff, W.P., Prasad, R., Sawaya, M.R., Jaju, M., Wood, T.G., Kraut, J., Kunkel, T.A. and Wilson, S.H. (1996) Enzyme-DNA interactions required for efficient nucleotide incorporation and discrimination in human DNA polymerase β . *J. Biol. Chem.* **271**, 12141-12144.
125. Umar, A. and Kunkel, T.A. (1996) DNA replication fidelity, mismatch repair and genome instability in cancer cells. *Eur. J. Biochem.* **238**, 297-307.
126. Edelman, W., Cohen, P.E., Kane, M., Lau, K., Morrow, B., Bennett, S.E., Umar, A., Kunkel, T.A., Cattoretti, G., Chaganti, R., Pollard, J.W., Kolodner, R.D. and Kucherlapati, R. (1996) Meiotic pachytene arrest in MLH1-deficient mice. *Cell* **85**, 1125-1134.
127. Roberts, J.D. and Kunkel, T.A. (1996) Fidelity of DNA replication. Chapter 7 in: *DNA Replication in Eukaryotic Cells*. (ed. M. L. DePamphilis). Cold Spring Harbor Laboratory Press, Cold Spring Harbor, New York, pp. 217-247.
128. Thomas, D.C., Svoboda, D.L., Vos, J.-M.H. and Kunkel, T.A. (1996) Strand specificity of mutagenic bypass replication of DNA containing psoralen monoadducts in a human cell extract. *Molec. Cell. Biol.* **16**, 2537-2544.
129. Risinger, J.I., Umar, A., Boyd, J., Berchuck, A., Kunkel, T.A., and Barrett, J.C. (1996) Mutation of hMSH3 in endometrial cancers and evidence for its functional role in heteroduplex repair. *Nature Genetics* **14**, 102-105.
130. Umar, A., Buermeier, A.B., Simon, J.A., Thomas, D.C., Clark, A., Liskay, R.M. and Kunkel, T.A. (1996) Requirement for PCNA in DNA mismatch repair at a step preceding DNA resynthesis. *Cell* **87**, 65-73.
131. Minnick, D.T., Astatke, M., Joyce, C.M. and Kunkel, T.A. (1996) A thumb subdomain mutant of the large fragment of *Escherichia coli* DNA polymerase I with reduced DNA binding affinity, processivity and frameshift fidelity. *J. Biol. Chem.* **271**, 24954-24961.
132. Parkinson, G., Gunasekera, A., Vojtechovsky, J., Zhang, X., Kunkel, T.A., Berman, H. and Ebright, R.H. (1996) Aromatic hydrogen bond in sequence-specific protein-DNA recognition. *Nature Struct. Biol.* **3**, 837-841.
133. Pavlov, Y.I., Suslov, V.V., Shcherbakova, P.V., Kunkel, T.A., Ono, A., Matsuda, A. and Schaaper, R.M. (1996) Base analog N⁶-hydroxylaminopurine mutagenesis in *Escherichia coli*: genetic control and molecular specificity. *Mutat. Res.* **357**, 1-15.
134. Kunkel, T.A. and Wilson, S.H. (1996) Push and pull of base flipping. *Nature* **384**, 25-26.
135. Minnick, D.T. and Kunkel, T.A. (1996) DNA synthesis errors, mutators and cancer. *Cancer Surveys* **28**, 3-20.
136. Kunkel, T.A., Resnick, M. and Gordenin, D. (1997) Mutator specificity and disease: Jumping over the FENCE. *Cell* **88**, 155-158.
137. Bell, J.B., Eckert, K.A., Joyce, C.M. and Kunkel, T.A. (1997) Base miscoding and strand misalignment errors by mutator Klenow polymerases with amino acid substitutions at tyrosine 766 in the O helix of the fingers subdomain. *J. Biol. Chem.* **272**, 7345-7351.

138. Bebenek, K., Beard, W.A., Darden, T.A., Li, L., Prasad, R., Luxon, B.A., Gorenstein, D.G., Wilson, S.H. and Kunkel, T.A. (1997) A minor groove binding track in reverse transcriptase. *Nature Struct. Biol.* **4**, 194-197.
139. Forgacs, E., Latham, G., Beard, W.A., Prasad, R., Bebenek, K., Kunkel, T.A., Wilson, S.H. and Lloyd, R.S. (1997) Probing structure-function relationships of HIV-1 reverse transcriptase with styrene oxide N-guanine adducts. *J. Biol. Chem.* **272**, 8474-8481.
140. Gordenin, D., Kunkel, T.A. and Resnick, M. (1997) Repeat expansion – all in a flap? *Nature Genet.* **16**, 116-118.
141. Bennett, S.E., Umar, A., Oshima, J., Monnat, R.Jr. and Kunkel, T.A. (1997) Mismatch repair in extracts of Werner Syndrome immortalized cell lines. *Cancer Res.* **57**, 2956-2960.
142. Umar, A., Koi, M., Risinger, J.I., Glaab, W., Tindall, K.R., Kolodner, R.D., Boland, C.R., Barrett, J.C. and Kunkel, T.A. (1997) Correction of hypermutability, N-Methyl-N'-nitro-N-nitrosoguanidine-resistance and defective DNA mismatch repair by introducing chromosome 2 into human tumor cells with mutations in *MSH2* and *MSH6*. *Cancer Res.* **57**, 3949-3955.
143. Edelmann, W., Yang, K., Umar, A., Heyer, J., Lau, K., Fan, K., Liedtke, W., Cohen, P., Kand, M.F., Lipford, J.R., Yu, N., Crouse, G.F., Pollard, J., Kunkel, T.A., Lipkin, M., Kolodner, R. and Kucherlapati, R. (1997) Mutation in the mismatch repair gene *Msh6* causes cancer susceptibility. *Cell* **91**, 467-477.
144. Kunkel, T.A. and Wilson, S.H. (1998) DNA polymerases on the move. *Nature Struct. Biol.* **5**, 95-99.
145. Glaab, W.E., Risinger, J.I., Umar, A., Barrett, J.C., Kunkel, T.A. and Tindall, K.R. (1998) Cellular resistance and hypermutability in mismatch repair-deficient human cancer cell lines following treatment with methyl methanesulfonate. *Mut. Res.* **398**, 197-207.
146. Umar, A., Risinger, J.I., Glaab, W.E., Tindall, K.R., Barrett, J.C., and Kunkel, T.A. (1998) Functional overlap in mismatch repair by human *MSH3* and *MSH6*. *Genetics* **148**, 1637-1646.
147. Kroutil, L.C., Frey, M.W., Kaboord, B.F., Kunkel, T.A. and Benkovic, S.J. (1998) Effect of accessory proteins on T4 DNA polymerase replication fidelity. *J. Molec. Biol.* **278**, 135-146.
148. Winter, D.B., Phung, Q.H., Umar, A., Baker, S.M., Tarone, R.E., Tanaka, K., Liskay, R.M., Kunkel, T.A., Bohr, V.A., and Gearhart, P.J. (1998) Altered spectra of hypermutation in antibodies from mice deficient for the DNA mismatch repair protein PMS2. *Proc. Natl. Acad. Sci. USA* **95**, 6953-6958.
149. Hermann, J.G., Umar, A., Polyak, K., Graff, J.R., Ahuja, N., Ahuja, N., Issa, J.-P.J., Markowitz, S., Willson, J.K.V., Hamilton, S.R., Kinzler, K.W., Kane, M.K., Kolodner, R.D., Vogelstein, B., Kunkel, T.A. and Baylin, S.B. (1998) Incidence and functional

- consequences of *hMLH1* promoter hypermethylation in colorectal carcinoma. *Proc. Natl. Acad. Sci. USA* **95**, 6870-6875.
150. Risinger, J.I., Umar, A., Glaab, W.E., Tindall, K.R., Kunkel, T.A. and Barrett, J.C. (1998) Single gene complementation of the hPMS2 defect in HEC-1-A endometrial carcinoma cells. *Cancer Res.* **58**, 2978-2981.
151. Tindall, K.R., Glaab, W., Umar, A., Risinger, J.I., Koi, M. Barrett, J.C. and Kunkel, T.A. (1998) Complementation of mismatch repair gene defects by chromosome transfer. *Mut. Res.* **402**, 15-22.
152. Vaisman, A., Varchenko, M., Umar, A., Kunkel, T.A., Risinger, J.I., Barrett, J.C., Hamilton, T.C. and Chaney, S.G. (1998) The role of hMLH1, hMSH3, and hMSH6 defects in cisplatin and oxaliplatin resistance: Correlation with replicative bypass of platinum-DNA adducts. *Cancer Res.* **58**, 3579-3585.
153. Glaab, W.E., Risinger, J.I., Umar, A., Kunkel, T.A., Barrett, J.C. and Tindall, K.R. (1998) Characterization of distinct human endometrial carcinoma cell lines deficient in mismatch repair that originated from a single tumor. *J. Biol. Chem.* **273**, 26662-26669.
154. Beard, W.A., Bebenek, K., Darden, T.A., Li, L., Prasad, R., Kunkel, T.A. and Wilson, S.H. (1998) Vertical-scanning mutagenesis of a critical tryptophan in the minor groove binding track of HIV-1 reverse transcriptase: Molecular nature of polymerase-nucleic acid interactions. *J. Biol. Chem.* **273**, 30435-30442.
155. Glaab, W.E., Risinger, J.I., Umar, A., Barrett, J.C., Kunkel, T.A. and Tindall, K.R. (1998) Resistance to 6-thioguanine in mismatch repair-deficient human cancer cell lines correlates with an increase in induced mutations at the *HPRT* locus. *Carcinogenesis* **19**, 1931-1937.
156. Kroutil, L.C. and Kunkel, T.A. (1998) DNA replication errors involving strand misalignments. In: Genetic Instabilities and Hereditary Neurological Diseases (eds. R. D. Wells and S. T. Warren) Academic Press, Inc., pp 699-716.
157. Hulla, J. E., Miller, M. S., Taylor, J.A., Hein, D.W., Furlong, C.E., Omiecinski, C.J., and Kunkel, T.A. (1998) Symposium overview: The role of genetic polymorphism and repair deficiencies in environmental disease, *Toxicological Sciences* **47**, 135-143.
158. Bennett, S.E., Umar, A., Kodama, S., Barrett, J.C., Monnat, R.J.Jr., and Kunkel, T.A. (1999) Evidence Against a Role for the Werner Syndrome Gene Product in DNA Mismatch Repair. In: *The Molecular Biology of Ageing. Alfred Benzon Symp.* **44**, 214-224, eds. V.A. Bohr, F.C. Clark and T. Tevnsner, Munksgaard, Copenhagen.
159. Minnick, D.T., Bebenek, K., Osheroff, W.P., Turner, R.M., Jr., Astatke, M., Liu, L., Kunkel, T.A. and Joyce, C.M. (1999) Side chains that influence fidelity at the polymerase active site of *E. coli* DNA polymerase I (Klenow fragment). *J. Biol. Chem.* **274**, 3067-3075.
160. Osheroff, W.P., Jung, H.K., Beard, W.A., Wilson, S.H. and Kunkel, T.A. (1999) The fidelity of DNA polymerase β during distributive and processive DNA synthesis. *J. Biol. Chem.* **274**, 3642-3650.

161. Clark, A.B., Cook, M.E., Tran, H.T., Gordenin, D.A., Resnick, M.A. and Kunkel, T.A. (1999) Functional analysis of human MutS α and MutS β complexes in yeast. *Nucleic Acids Res.* **27**, 736-742.
162. Kunkel, T.A. (1999) The high cost of living. *Trends in Genetics* **15**, 93-94.
163. Drotschmann, K., Clark, A.B., Tran, H.T., Resnick, M.A., Gordenin, D.A. and Kunkel, T.A. (1999) Mutator phenotypes of yeast strains heterozygous for mutations in the *MSH2* gene. *Proc. Natl. Acad. Sci. USA* **96**, 2970-2975.
164. Shcherbakova, P. and Kunkel, T.A. (1999) Mutator phenotypes conferred by *MLH1* overexpression and by heterozygosity for *mlh1* mutations. *Molec. Cell. Biol.* **19**, 3177-3183.
165. Powell, M.D., Beard, W.A., Bebenek, K.A., Howard, K.J., Le Grice, S.F.J., Darden, T.A., Kunkel, T.A., Wilson, S.H. and Levin, J.G. (1999) Residues in the α H and α I helices of the HIV-1 reverse transcriptase thumb subdomain required for the specificity of the RNase H-catalyzed removal of the polypurine tract primer. *J. Biol. Chem.* **274**, 19885-19893.
166. Osheroff, W. P., Beard, W.A., Wilson, S.H. and Kunkel, T.A. (1999) Base substitution specificity of DNA polymerase β depends on interactions in the DNA minor groove. *J. Biol. Chem.* **274**, 20749-20752.
167. Kroutil, L.C. and Kunkel, T.A. (1999) Strand slippage during replication of CAG repeat sequences by DNA polymerases. *Nucl. Acids Res.* **27**, 3481-3486.
168. Drotschmann, K., Clark, A.B. and Kunkel, T.A. (1999) Mutator phenotypes of common polymorphisms and missense mutations in *MSH2*. *Current Biology* **9**, 907-910.
169. Bebenek, K., Boyer, J.C. and Kunkel, T.A. (1999) The base substitution fidelity of HIV-1 reverse transcriptase on DNA and RNA templates probed with 8-oxo-deoxyguanosine triphosphate. *Mutat. Res.* **429**, 149-158.
170. Lewis, D.A., Bebenek, K., Beard, W.A., Wilson, S.H. and Kunkel, T.A. (1999) Uniquely altered DNA replication fidelity conferred by an amino acid change in the nucleotide binding pocket of human immunodeficiency virus type 1 reverse transcriptase. *J. Biol. Chem.* **274**, 32924-32930.
171. Edelman, W., Umar, A., Yang, K., Heyer, J., Kucherlapati, M., Lia, M., Kneitz, B., Avdievich, E., Fan, K., Wong, E., Crouse, G., Kunkel, T., Lipkin, M., Kolodner, R.D. and Kucherlapati, R. (2000) The DNA mismatch repair genes *Msh3* and *Msh6* cooperate in intestinal tumor suppression. *Cancer Res.* **60**, 803-807.
172. Wilson, S. H. and Kunkel, T.A. (2000) Passing the baton in base excision repair. *Nature Struct. Biol.* **7**, 176-178.
173. Borchers, C., Peter, J.F., Hall, M.C., Kunkel, T.A. and Tomer, K.B. (2000) Identification of in-gel digested proteins by complementary peptide-mass fingerprinting and tandem mass spectrometry data obtained on an electrospray ionization quadrupole time-of-flight mass spectrometer. *Anal. Chem.* **72**, 1163-1168.

174. Matsuda, T., Bebenek, K., Masutani, C., Hanaoka, F. and Kunkel, T.A. (2000) Low fidelity DNA synthesis by human DNA polymerase η . *Nature* 404, 1011-1013.
175. Drotschmann, K., Shcherbakova, P.V. and Kunkel, T.A. (2000) Mutator phenotype due to loss of heterozygosity in diploid yeast strains with mutations in MSH2 and MLH1. *Proc. Toxicol. Letters* 112-113, 239-244.
176. Latham, G.J., Forgacs, E., Beard, W.A., Prasad, R., Bebenek, K., Kunkel, T.A., Wilson, S.H. and Lloyd, R.S. (2000) Vertical-scanning mutagenesis of a critical tryptophan in the "Minor Groove Binding Track" of HIV-1 reverse transcriptase: Major groove DNA adducts identify specific protein interactions in the minor groove. *J. Biol. Chem.* 275, 15025-15033.
177. Osheroff, W.P., Beard, W.A., Yin, S., Wilson, S.H. and Kunkel, T.A. (2000) Minor groove interactions at the DNA polymerase β active site modulate single-base deletion errors. *J. Biol. Chem.* 275, 28033-28038.
178. Kunkel, T.A. and Bebenek, K. (2000) DNA replication fidelity. *Annu. Rev. Biochem.* 69, 497-529.
179. Bebenek, K. and Kunkel, T.A. (2000) Streisinger revisited: DNA synthesis errors mediated by substrate misalignments. *Cold Spring Harbor Symp. Quant. Biol.* LXV, 81-91.
180. Gerlach, V.L., Feaver, W.J., Fischhaber, P.L., Richardson, J.A., Aravind, L., Koonin, E.V., Bebenek, K., Kunkel, T.A. and Friedberg, E.C. (2000) Human DNA polymerase κ : A novel DNA polymerase of unknown biological function encoded by the *DINB1* gene. *Cold Spring Harbor Symp. Quant. Biol.* LXV, 41-49.
181. Ohashi, E., Bebenek, B., Matsuda, T., Feaver, W.J., Gerlach, V.L., Friedberg, E.C., Ohmori, H. and Kunkel, T.A. (2000) Fidelity and processivity of DNA synthesis by DNA polymerase κ , the product of the human *DINB1* gene. *J. Biol. Chem.* 275, 39678-39684.
182. Clark, A.B., Valle, F., Gary, R.K. and Kunkel, T.A. (2000) Functional interaction of PCNA with MSH2•MSH6 and MSH2•MSH3 complexes. *J. Biol. Chem.* 275, 36498-36501.
183. Watanabe, Y., Huagen-Strano, A., Umar, A., Yamada, K., Hemmi, H., Kikuchi, Y., Takano, S., Shibata, Y., Barrett, J.C., Kunkel, T.A. and Koi, M. (2000) Complementation of a hMSH2 defect in human colorectal carcinoma cells by human chromosome 2 transfer. *Molec. Carcinogen.* 29, 37-49.
184. Li, Liping, Darden, T.A., Pedersen, L.G., Beard, W.A., Bebenek, K., Wilson, S.H. and Kunkel, T.A. (2000) A molecular dynamics model of HIV-1 reverse transcriptase complexed with DNA: Comparison with experimental structures. *J. Mol. Modeling* 6, 575-586.
185. Shcherbakova, P., Hall, M.C., Lewis, M., Bennett, S.E., Martin, K.J., Bushel, P.R., Afshari, C.A. and Kunkel, T.A. (2001) Inactivation of DNA mismatch repair by increased expression of yeast *MLH1*. *Molec. Cell. Biol.* 21, 940-951.

186. Bebenek, K., Matsuda, T., Masutani, C., Hanaoka, F. and Kunkel, T.A. (2001) Proofreading of DNA polymerase η -dependent replication errors. *J. Biol. Chem.* 276, 2317-2320.
187. Hall, M.C. and Kunkel, T.A. (2001) Purification of eukaryotic MutL homologs from *Saccharomyces cerevisiae* using self-cleaving affinity technology. *Protein Expression & Purification* 21, 333-342.
188. Bebenek, K., Tissier, A., Frank, E.G., McDonald, J.P., Prasad, R., Wilson, S.H., Woodgate, R. and Kunkel, T.A. (2001) 5'-dexoribose phosphate lyase activity of human DNA polymerase ι in vitro. *Science* 291, 2156-2159.
189. Jin, Y.H., Obert, R., Burgers, P.M.J., Kunkel, T.A., Resnick, M.A. and Gordenin, D.A. (2001) The 3' to 5' exonuclease of DNA polymerase δ can substitute for the 5' flap endonuclease Rad27 / Fen1 in processing Okazaki fragments and preventing genome instability. *Proc. Natl. Acad. Sci. U.S.A.* 98, 5122-5127.
190. Rogozin, I.B, Pavlov, Y.I, Bebenek, K., Matsuda, T. and Kunkel, T.A. (2001) Correlation between hot spots for somatic mutation in immunoglobulin genes and DNA synthesis errors by DNA polymerase η . *Nature Immunol.* 2, 530-536.
191. Pavlov, Y. I., Nguyen, D. and Kunkel, T.A. (2001) Mutator effects of overproducing DNA polymerase η (Rad30) and its catalytically inactive variant in yeast. *Mutat. Res.* 478, 129-139.
192. Ohmori, H., Friedberg, E.C., Fuchs, R.P.P., Goodman, M.F., Hanaoka, F., Hinkle, D., Kunkel, T.A., Lawrence, C., Livneh, Z., Nohmi, T., Prakash, L., Prakash, S., Todo, T., Walker, G.C., Wang, Z. and Woodgate, R. (2001) The Y-family of DNA polymerases. *Molec. Cell* 8, 7-8.
193. Langland, G., Kordich, J., Creancy, J., Heppner Gopss, K., Lillard-Wetherell, K., Bebenek, K., Kunkel, T.A. and Groden, J. (2001) The BLM helicase interacts with hMLH1 but is not required for DNA mismatch repair. *J. Biol. Chem.* 276, 30031-30035.
194. Pavlov, Y.I., Shcherbakova, P.V., Bebenek, K. and Kunkel, T.A. (2001) *In vivo* consequences of putative active site missense mutations in yeast replicative DNA polymerases α , δ and ϵ . *Genetics* 159, 47-64.
195. Thykjaer, T., Christensen, M., Clark, A.B., Hansen, L.R., Kunkel, T.A. Wolf, H. and Ørntoft, T.F. (2001) Functional analysis of the mismatch repair system in bladder cancer. *British J. Cancer* 85, 568-575.
196. García-Díaz, M., Bebenek, K., Kunkel, T.A. and Blanco, L. (2001) Identification of an intrinsic dRP lyase activity in human DNA polymerase lambda: a possible role in base excision repair. *J. Biol. Chem.* 276, 34659-34663.
197. Matsuda, T., Bebenek, K., Masutani, C., Rogozin, I., Hanaoka, F. and Kunkel, T.A. (2001) Error rate and specificity of human and murine DNA polymerase η . *J. Molec. Biol.* 312, 335-346.
198. Hall, M.C., Wang, H., Erie, D.A. and Kunkel, T.A. (2001) High affinity cooperative DNA binding by the yeast Mlh1-Pms1 heterodimer. *J. Molec. Biol.* 312, 637-647.

199. Rogozin, I.B., Pavlov, Y.I. and Kunkel, T.A. (2001) Estimating the impact of DNA polymerase η on somatic hypermutation. *Nature Immunol.* 2, 983-984.
200. Longley, M.J., Nguyen, D., Kunkel, T.A. and Copeland, W.C. (2001) The fidelity of human DNA polymerase γ with and without exonucleolytic proofreading and the p55 accessory subunit. *J. Biol. Chem.* 276, 38555-38562.
201. Chen, S., Gunasekera, A., Zhang, X., Kunkel, T.A., Ebright, R.H. and Berman, H.M. (2001) Indirect readout of DNA sequence at the primary-kink site in the CAP-DNA complex: Alteration of DNA binding specificity through alteration of DNA kinking. *J. Molec. Biol.* 314, 75-82.
202. Drotschmann, K.D., Yang, W., Brownnewell, F. E., Kool, E. T. and Kunkel, T.A. (2001) Asymmetric recognition of DNA local distortion: Structure-based functional studies of eukaryotic Msh2-Msh6. *J. Biol. Chem.* 276, 46225-46230.
203. Rogozin, I.B., Kunkel, T.A. and Pavlov, Y.I. (2002) Double-Strand Breaks in DNA During Somatic Hypermutation of Immunoglobulin Genes: Cause or Consequence? *Trends Immunol.* 23, 12-13.
204. Hall, M.C., Shcherbakova, P.V. and Kunkel, T.A. (2002) Differential ATP binding and intrinsic ATP hydrolysis by amino terminal domains of the yeast Mlh1 and Pms1 proteins. *J. Biol. Chem.* 277, 3673-3679.
205. Minnick, D.T., Liu, L., Grindley, N.D.F., Kunkel, T.A., and Joyce, C.J. (2002) Discrimination against purine-pyrimidine mispairs in the polymerase active site of DNA Polymerase I: a structural explanation. *Proc. Natl. Acad. Sci. USA* 99, 1194-1199.
206. García-Díaz, M., Bebenek, K., Sabariego, R., Dominguez, O., Rodriguez, J., Kirchhoff, T., Garcia-Palomero, E., Picher, A.J., Juárez, R., Ruiz, J.F., Kunkel, T.A. and Blanco, L. (2002) DNA polymerase lambda, a novel DNA repair enzyme in human cells. *J. Biol. Chem.* 277, 13184-13191.
207. Ponamarev, P., Longley, M.J., Nguyen, D., Kunkel, T.A. and Copeland, W.C. (2002) Active site mutation in DNA polymerase γ associated with Progressive External Ophthalmoplegia causes error-prone DNA synthesis. *J. Biol. Chem.* 277, 15225-15228.
208. Kokoska, R.J., Bebenek, K., Boudsocq, F., Woodgate, R., Yang, W. and Kunkel, T.A. (2002) Low fidelity DNA synthesis by a Y family DNA polymerase due to misalignment in the active site. *J. Biol. Chem.* 277, 19633-19638.
209. Drotschmann, K., Hall, M.C., Shcherbakova, P.V., Wang, H., Erie, D., Brownnewell, F.R., Kool, E.T. and Kunkel, T.A. (2002) DNA binding properties of the yeast Msh2-Msh6 and Mlh1-Pms1 heterodimers. *Biol. Chem.* 383, 969-975
210. Pavlov, Y.I., Newlon, C.S. and Kunkel, T.A. (2002) Yeast origins establish a strand bias for replicational mutagenesis. *Molec. Cell* 10, 207-213.
211. Drotschmann, K., Yang, W. and Kunkel, T.A. (2002) Evidence for sequential action of two ATPase active sites in yeast Msh2-Msh6. *DNA Repair* 1, 743-753.
212. Bebenek, K. and Kunkel, T.A. (2002) Family Growth: The eukaryotic DNA polymerase revolution. *Cell. Molec. Life Sci.* 59, 54-57.

213. Pavlov, Y.I., Rogozin, I.B., Galkin, A.P., Aksenova, A.Y., Hanaoka, F., Rada, C. and Kunkel, T.A. (2002) Evidence for participation of DNA polymerase η in somatic hypermutation of an immunoglobulin κ light chain transgene. *Proc. Natl. Acad. Sci. USA* **99**, 9954-9959.
214. Kunkel, T.A. and Diaz, M. (2002) Enzymatic Cytosine Deamination – Friend AND Foe. *Molec. Cell* **10**, 962-963.
215. Copeland, W.C., Ponamarev, M.V., Nguyen, D., Kunkel, T.A. and Longley, M.J. (2003) Mutations in DNA polymerase gamma cause error prone DNA synthesis in human mitochondrial disorders. *Acta Biochimica Polonica* **50**, 155-167.
216. Hoffmann, E.R., Shcherbakova, P.V., Kunkel, T.A. and Borts, R.H. (2003) MLH1 mutations differentially affect meiotic functions in *Saccharomyces cerevisiae*. *Genetics* **163**, 515-526.
217. Kunkel, T.A., Pavlov, Y.I. and Bebenek, K. (2003) Functions of human DNA polymerases η , κ and ι suggested by their properties, including fidelity with undamaged DNA templates. *DNA Repair* **2**, 135-149.
218. Wei, K., Clark, A. B., Wong, E., Kane, M.F., Mazur, D., Parris, T., Kolas, N., Russell, R., Hou, H., Kneitz, B., Yang, G., Kunkel, T. A., Kolodner, R. D., Cohen, P. E. and Edelman, W. (2003) Inactivation of Exonuclease 1 in mice results in DNA mismatch defects, increased cancer susceptibility and male and female sterility. *Genes & Development* **17**, 603-614.
219. Kunkel, T.A. (2003) Considering the cancer consequences of altered DNA polymerase function. *Cancer Cell* **3**, 105-110.
220. Shcherbakova, P.V., Bebenek, K. and Kunkel, T.A. (2003) Functions of eukaryotic DNA polymerases. *Science of Aging Knowledge Environment*, at website: sageke.sciencemag.org/cgi/content/full/sageke;2003/8/re3
221. Pavlov, Y.I., Mian, I.M. and Kunkel, T.A. (2003) Evidence for preferential mismatch repair of lagging strand DNA replication errors in yeast. *Current Biology* **13**, 744-748.
222. Hall, M.C., Shcherbakova, P.V., Fortune, J.M., Borchers, C., Dial, J.M., Tomer, K.B. and Kunkel, T.A. (2003) DNA binding by *Saccharomyces cerevisiae* Mlh1-Pms1: Implications for DNA mismatch repair. *Nucleic Acids Research* **31**, 2025-2034.
223. Glick, E., Chau, J.S., Vigna, K.L., McCulloch, S.D., Adman, E.T., Kunkel, T.A. and Loeb, L.A. (2003) Amino acid substitutions at conserved tyrosine 52 alter fidelity and bypass efficiency of human DNA polymerase η . *J. Biol. Chem.* **278**, 19341-19346.
224. Jin, Y.H., Slebos, R.J.C.; Clark.A., Al-Refai, Taylor, J.A., Kunkel, T.A., Resnick, M.A. and Gordenin, D.A. (2003) Cadmium inhibits DNA mismatch repair in yeast and human cells. *Nature Genetics* **334**, 326-329.
225. Kozim, S.G., Pavlov, Y.I., Kunkel, T.A. and Sage, E. (2003) Roles of *Saccharomyces cerevisiae* DNA polymerases Pol η and Pol ζ in response to irradiation by simulated sunlight. *Nucl. Acids Res.* **31**, 4541-4552.

226. Matsuda, T., Vande Berg, B.J., Bebenek, K., Osheroff, W.P., Wilson, S.H. and Kunkel, T.A. (2003) The base substitution fidelity of DNA polymerase β -dependent single-nucleotide base excision repair. *J. Biol. Chem.* **278**, 25947-25951.
227. DeRose, E.F., Kirby, T.W., Mueller, G.A., Bebenek, K., García-Díaz, M., Blanco, L., Kunkel, T.A. and London, R.E. (2003) Solution structure of the lyase domain of human DNA polymerase λ . *Biochemistry* **42**, 9564-9574.
228. Prasad, R., Bebenek, K., Hou, E. Shock, D., Beard, W.A., Woodgate, R., Kunkel, T.A. and Wilson, S.H. (2003) Localization of the deoxyribose phosphate lyase active site in human DNA polymerase τ by controlled proteolysis. *J. Biol. Chem.* **278**, 29649-29654.
229. Bebenek, K., García-Díaz, M., Blanco, L. and Kunkel, T.A. (2003) The frameshift fidelity of human DNA polymerase λ : Implications for function. *J. Biol. Chem.* **278**, 34685-34690.
230. Shcherbakova, P.V., Pavlov, Y.I., Chilkova, O., Rogozin, I.B., Johansson, E. and Kunkel, T.A. (2003) Unique error signature of the four-subunit yeast DNA polymerase ϵ . *J. Biol. Chem.* **278**, 43770-43780.
231. Kokoska, R.J., McCulloch, S.D. and Kunkel, T.A. (2003) The efficiency and fidelity of apurinic/aprimidinic site bypass by human DNA polymerase η and *Sulfolobus sulfataricus* Dpo4. *J. Biol. Chem.* **278**, 50537-50545.
232. Lee, J.W., Blanco, L., Zhou, T., Garcia-Diaz, M., Bebenek, K., Kunkel, T.A., Wang, Z. and Povirk, L.F. (2004) Implication of DNA polymerase λ (pol λ) in alignment-based gap filling for nonhomologous DNA end joining in human nuclear extracts. *J. Biol. Chem.* **279**, 805-811
233. Lin, D.P., Wang, Y., Scherer, S.J., Clark, A.B., Yang, K., Avdievich, E., Jin, B., Werling, U., Parris, T., Kurihara, N., Umar, A., Kucherlapati, R., Lipkin, M., Kunkel, T.A. and Edelman, W. (2004) An Msh2 point mutation uncouples DNA mismatch repair and apoptosis. *Cancer Research* **64**, 517-522.
234. Wang, M., Devereux, T.R., Vikis, H.G., McCulloch, S.D., Holliday, W., Anna, C., Wang, Y., Bebenek, K., Kunkel, T.A., Guan, K. and You, M. (2004) Pol τ is a candidate for the mouse pulmonary adenoma resistance 2 locus, a major modifier of chemically induced lung neoplasia. *Cancer Research* **64**, 1924-1931.
235. Garcia-Diaz, M., Bebenek, K., Krahn, J.M., Blanco, L., Kunkel, T.A. and Pedersen, L. C. (2004) A structural solution for the DNA polymerase λ -dependent repair of DNA gaps with minimal homology. *Molec. Cell* **13**, 561-572.
236. McCulloch, S.D., Kokoska, R.J., Masutani, C., Iwai, S., Hanaoka, F. and Kunkel, T.A. (2004) Preferential *cis-syn* thymine dimer bypass by DNA polymerase η occurs with biased fidelity. *Nature* **428**, 97-100.
237. Poltoratsky, V., Wilson, S.H., Kunkel, T.A., and Pavlov, Y.I. (2004) Recombinogenic phenotype of human activation-induced cytidine deaminase. *J. Immunol.* **172**, 4308-4313.
238. Kunkel, T.A. (2004) DNA replication fidelity. *J. Biol. Chem.* **279**, 16895-16898.

239. Pavlov, Y.I., Maki, S., Maki, H. and Kunkel, T.A. (2004) Evidence for interplay among yeast replicative DNA polymerases alpha, delta and epsilon from studies of exonuclease and polymerase active site mutations. *BMC Biology* **2**, 11.
240. McCulloch, S.D., Kokoska, R.J. and Kunkel, T.A. (2004) Efficiency, fidelity and enzymatic switching during translesion DNA synthesis. *Cell Cycle* **3**, 580-583.
241. Boudsocq, F., Kokoska, R.J., Plotsky, B., Vaisman, A., Ling, H., Kunkel, T.A., Yang, W. and Woodgate, R. (2004) Investigating the role of the little finger domain of Y family DNA polymerases in low fidelity synthesis and translesion replication. *J. Biol. Chem.* **279**, 32932-32940.
242. McCulloch, S.D., Kokoska, R.J., Chilkova, O., Welch, C.M., Johansson, E., Burgers, P.M.J. and Kunkel, T.A. (2004) Enzymatic switching for efficient and accurate translesion DNA replication. *Nucl. Acids Res.* **32**, 4665-4675.
243. Brieba, L.G., Eichman, B.F., Kokoska, R.J., Doubl  , S., Kunkel, T.A. and Ellenberger, T. (2004) Structural basis for the dual coding potential of 8-oxoguanosine by a high fidelity DNA polymerase. *EMBO J.* **23**, 3452-3461.
244. Bebenek, K. and Kunkel, T.A. (2004) Functions of DNA polymerases. *Adv. Protein Chem.* **69**, 137-165.
245. Clark, A.B. and Kunkel, T.A. (2004) Cadmium inhibits the functions of eukaryotic MutS complexes. *J. Biol. Chem.* **279**, 53903-53906.
246. Jin, Y.H., Garg, P., Stith, C.M.W., Al-Refai, H., Sterling, J.F., Murray, L.J.W., Kunkel, T.A., Resnick, M.A., Burgers, P.M. and Gordenin, D.A. (2005) The multiple biological roles of the 3' → 5' exonuclease of *Saccharomyces cerevisiae* DNA polymerase δ require switching between the polymerase and exonuclease domains. *Molec. Cell. Biol.* **25**, 461-471.
247. Garcia-Diaz, M. Bebenek, K., Krahn, J.M., Kunkel, T.A. and Pedersen, L.C. (2005) A closed conformation for the pol lambda catalytic cycle. *Nat. Struct. Mol. Biol.* **12**, 97-98.
248. Kunkel, T.A. and Erie, D. (2005) DNA mismatch repair. *Annu. Rev. Biochem.* **74**, 681-710.
249. Song, S., Pursell, Z.F., Copeland, W.C., Longley, M.J., Kunkel, T.A. and Mathews, C.K. (2005) DNA precursor asymmetries in mammalian tissue mitochondria and possible contribution to mitochondrial mutagenesis through reduced replication fidelity. *Proc. Natl. Acad. Sci. U.S.A.* **102**, 4990-4995.
250. Mayorov, V.I., Rogozin, I.B., Adkison, L.R., Frahm, C.R., Kunkel, T.A. and Pavlov, Y.I. (2005) Expression of human AID in yeast induces mutations in context similar to the context of somatic hypermutation at G-C pairs in immunoglobulin genes. *BMC Immunology* **6**,10.
251. Bebenek, K., Garcia-Diaz, M., Patishall, S.R. and Kunkel, T.A. (2005) Biochemical properties of *Saccharomyces cerevisiae* DNA polymerase IV. *J. Biol. Chem.* **280**, 20051-20058.

252. Kunkel, T.A. (2005) DNA replication and repair reactions relevant to the AHS. *J. Biochem. Molec. Toxicol.* **19**, 190-191.
253. Kunkel, T.A. (2005) The functions and fidelity of human DNA polymerases. *AACR Education Book 2005*, 246-249.
254. Nick-McElhinny, S.A., Havener, J.M., Garcia-Diaz, M., Juárez, R., Bebenek, K., Kee, B.L., Blanco, L., Kunkel, T.A. and Ramsden, D.A. (2005) A gradient of template dependence defines distinct biological roles for family X polymerases in nonhomologous end-joining. *Molec. Cell* **19**, 357-366.
255. Fortune, J., Pavlov, Y.I., Welch, C.M., Burgers, P.M.J. and Kunkel, T.A. (2005) *Saccharomyces cerevisiae* DNA polymerase δ holoenzyme: High fidelity for base substitutions but low fidelity for single- and multi-base deletions. *J. Biol. Chem.* **280**, 29980-29987.
256. Garcia-Diaz, M., Bebenek, K., Gao, G., Pedersen, L.C., London, R.E. and Kunkel, T.A. (2005) Structure-function studies of DNA polymerase lambda. *DNA Repair* **4**, 1358-1367
257. Brieba, L.G., Kokoska, R.J., Bebenek, K., Kunkel, T.A. and Ellenberger, T. (2005) A lysine residue in the fingers subdomain of T7 DNA polymerase modulates the miscoding potential of 8-oxo-7,8-dihydroguanosine. *Structure* **13**, 1653-1659
258. McCulloch, S.D and Kunkel, T.A. (2006) Measuring the fidelity of translesion DNA synthesis. *Meth. Enzymol.*, **408**, DNA Repair Part A, pp 341-355. J.L. Campbell & P. Modrich (eds.)
259. Lin, Q., Clark, A.B., McCulloch, S.D., Yuan, T., Bronson, R.T., Kunkel, T.A. and Kucherlapati, R. (2006) Increased susceptibility to UV-induced skin carcinogenesis in polymerase η -deficient mice. *Cancer Research* **66**, 87-94.
260. Gacia-Diaz, M., Bebenek, K., Krahn, J.M, Pedersen, L.C. and Kunkel, T.A. (2006) Structural analysis of strand misalignment during DNA synthesis by a human DNA polymerase. *Cell* **124**, 331-342.
261. Pavlov, Y.I, Frahm, C., Nick-McElhinny, S., Niimi, A., Suzuki, M. and Kunkel, T.A. (2006) Evidence that errors made by DNA polymerase α are corrected by DNA polymerase δ . *Current Biology* **16**, 202-207.
262. Gacia-Diaz, M. and Kunkel, T.A. (2006) Mechanism of a genetic glissando: structural biology of indel mutations. *Trends Biochem. Sci.* **31**, 206-214.
263. Nick McElhinny, S., Pavlov, Y.I. and Kunkel, T.A. (2006) Evidence for extrinsic exonucleolytic proofreading. *Cell Cycle* **5**, 958-962.
264. Shcherbakova, P.V. and Kunkel, T.A. (2006) DNA polymerases and the fidelity of DNA replication. In *DNA replication and human disease* (ed. M.L. DePamphilis), pp. 391-410. Cold Spring Harbor Laboratory Press, Cold Spring Harbor, New York.
265. Kunkel, T.A. and Van Houten, B. (2006) Survival choices. *Nature Cell Biol.* **8**, 547-549.

266. Picher, A.J., García-Díaz, M., Bebenek, K., Pedersen, L.C., Kunkel, T.A. and Blanco, L. (2006) Promiscuous mismatch extension by human DNA polymerase lambda. *Nucl. Acids Res.* **34**, 3259-3266.
267. Fortune, J., Stith, C.M., Kissling, G.E., Burgers, P.M.J. and Kunkel, T.A. (2006) RPA and PCNA suppress formation of large deletion errors by yeast DNA polymerase δ . *Nucl. Acids Res.* **34**, 4335-4341.
268. Zhong, X., Garg, P., Stith, C.M., Nick McElhinny, S.A., Burgers, P.M.J. and Kunkel, T.A. (2006) The fidelity of DNA synthesis by yeast DNA polymerase ζ with and without accessory proteins. *Nucl. Acids Res.* **34**, 4731-4742.
269. McCulloch, S.D. and Kunkel, T.A. (2006) Multiple solutions to inefficient lesion bypass by T7 DNA polymerase. *DNA Repair* **5**, 1373-1383.
270. Dumstorf, C.A., Clark, A.C., Lin, Q., Kissling, G.E., Yaun, T., Kucherlapati, R., McGregor, W.G. and Kunkel, T.A. (2006) Participation of mouse DNA polymerase iota in strand biased mutagenic bypass of UV photoproducts and suppression of skin cancer. *Proc. Natl. Acad. Sci. U.S.A.* **103**, 18083-18088.
271. Cutalo, J. M., Darden, T.A., Kunkel, T.A. and Tomer, K.B. (2006) Mapping the dimer interface in the C-terminal domains of the yeast Mlh1-Pms1 heterodimer. *Biochemistry*, **45**, 15458-15467.
272. Arana, M.E., Takata, K., Garcia-Diaz, M., Wood, R.D. and Kunkel, T.S. (2007) A unique error signature for human DNA polymerase ν . *DNA Repair* **6**, 213-223.
273. Moon, A.F., Garcia-Diaz, M., Bebenek, K., Davis, B.J., Zhong, X., Ramsden, D.A., Kunkel, T.A. and Pedersen, L.C. (2007) Structural insight into the substrate specificity of DNA polymerase μ . *Nature Struct. Molec. Biol.* **14**, 45-53.
274. Nick McElhinny, S.A., Stith, C.M., Burgers, P.M.J. and Kunkel, T.A. (2007) Inefficient proofreading and biased error rates during inaccurate DNA synthesis by a mutant derivative of *Saccharomyces cerevisiae* DNA polymerase δ . *J. Biol. Chem.* **282**, 2324-2332.
275. Luciani, M.G., Campregher, C., Fortune, J.M., Kunkel, T.A. and Gasche, C. (2007) Mesalazine affects cell cycle progression in colorectal cells by reversibly activating a replication checkpoint. *Gastroenterology* **132**, 221-235.
276. Holmes, S.F., Drotschmann Scarpinato, K., McCulloch, S.D., Schaaper, R.M. and Kunkel, T.A. (2007) Specialized mismatch repair function of Glu339 in the Phe-X-Glu motif of yeast Msh6. *DNA Repair* **6**, 293-303.
277. Barone, F., McCulloch, S.D., MacPherson, P., Maga, G., Yamada, M., Nohmi, T., Minoprio, A., Mazzei, F., Kunkel, T.A., Karran, P. and Bignami, M. (2007) Replication of 2-hydroxyadenine-containing DNA substrates and recognition by human MutS α . *DNA Repair* **6**, 355-366.
278. Storici, F., Bebenek, K., Kunkel, T.A., Gordenin, D.A. and Resnick, M.A. (2007) RNA-templated DNA repair. *Nature* **447**, 338-341.

279. Garcia-Diaz, M., Bebenek, K., Pedersen, L.C., and Kunkel, T.A. (2007) Role of the catalytic metal during polymerization by DNA polymerase lambda. *DNA Repair* **6**, 1333-1340.
280. Pursell, Z.P., Isoz, I., Lundström, E.-B., Johansson, E., and Kunkel, T.A. (2007) Regulation of B family DNA polymerase fidelity by a conserved active site residue: Characterization of M644W, M644L and M644F mutants of yeast DNA polymerase ϵ . *Nucl. Acids Res.* **35**, 3076-3086.
281. Clark, A.B., Deterding, L., Tomer, K.B. and Kunkel, T.A. (2007) Multiple functions for the N-terminal region of Msh6. *Nucl. Acids Res.* **35**, 4114-4123.
282. McCulloch, S.D., Garg, P., Burgers, P.J.M., and Kunkel, T.A. (2007) Effects of accessory proteins on bypass of a *cis-syn* thymine-thymine dimer by *Saccharomyces cerevisiae* DNA polymerase η . *Biochemistry* **46**, 8888-8896.
283. Pursell, Z.F., Isoz, I., Lundström, E.-B., Johansson, E. and Kunkel, T.A. (2007) Yeast DNA polymerase ϵ participates in leading strand DNA replication. *Science* **317**, 127-130.
284. Schatzlein, S., Kodandaramireddy, N.R., Ju, Z., Lechel, A., Stepzynska, A., Lilli, D.R., Clark, A.B., Rudolph, C., Wei, K., Schlegelberger, B., Schirmacher, P., Kunkel, T.A., Greenberg, R.A., Edelmann, W. and Rudolph, K.L. (2007) Exo1 deletion impairs DNA damage signal induction and prolongs lifespan of telomere dysfunctional mice. *Cell* **130**, 863-877.
285. Moon, A.F., Garcia-Diaz, M., Batra, V.K., Beard, W.A., Bebenek, K., Kunkel, T.A., Wilson, S.H. and Pedersen, L.C. (2007) The X family portrait: Structural insights into biological functions of X family DNA polymerases. *DNA Repair*, **6**, 1709-1725.
286. Sakamoto, A., Stone, J.E., Kissling, G.E., McCulloch, S.D., Pavlov, Y.I. and Kunkel, T.A. (2007) Mutator alleles of yeast DNA polymerase ζ . *DNA Repair*, **6**, 1829-1838.
287. Kadyrov, F.A., Holmes, S.F., Arana, M.E., Lukianova, O.A., O'Donnell, M., Kunkel, T.A. and Modrich, P. (2007) *Saccharomyces cerevisiae* MutL α is a mismatch repair endonuclease. *J. Biol. Chem.* **282**, 37181-37190.
288. Sacho, E.J., Karyov, F.A., Modrich, P., Kunkel, T.A. and Erie, D.A. (2008) Direct visualization of asymmetric adenine nucleotide induced conformational changes in MutL α . *Molec. Cell* **29**, 112-121. PMID: PMC2820111
289. McCulloch, S.D. and Kunkel, T.A. (2008) The fidelity of DNA synthesis by eukaryotic replicative and translesion synthesis polymerases. *Cell Research* **18**, 148-161. PMID: PMC3639319
290. Pursell, Z.F., MacDonald, J.T., Mathews, C.K. and Kunkel, T.A. (2008) Trace amounts of 8-oxo-dGTP in mitochondrial dNTPs reduce DNA polymerase γ replication fidelity. *Nucl. Acids Res.* **36**, 2174-2181. PMID: PMC2367704
291. Nick McElhinny, S.A., Gordenin, D.A., Stith, C.M., Burgers, P.M.J. and Kunkel, T.A. (2008) Division of labor at the eukaryotic replication fork. *Molec. Cell* **30**, 137-144. PMID: PMC2654179

292. Bebenek, K., Garcia-Diaz, M., Foley, M.C., Schlick, T. and Kunkel, T.A. (2008) Substrate-induced DNA strand misalignment during catalytic cycling by DNA polymerase lambda. *EMBO reports* **9**, 459-464. PMID: PMC2278112
293. Zhou, R.-Z., Blanco, L., Garcia-Diaz, M., Bebenek, K., Kunkel, T.A. and Povirk, L.F. (2008) Tolerance for 8-oxoguanine but not thymine glycol in alignment-based gap-filling of partially complementary double-strand break ends by DNA polymerases lambda in human nuclear extracts. *Nucl. Acids Res.* **36**, 2895-2905. PMID: PMC2396438
294. Pursell, Z.F. and Kunkel, T.A. (2008) DNA polymerase epsilon: a polymerase of unusual size and complexity. *Prog. Nucl. Acid Res. Molec. Biol.* **82**, 101-145. PMID: PMC3694787
295. Zhong, X., Pedersen, L.C. and Kunkel, T.A. (2008) Characterization of a replicative DNA polymerase mutant with reduced fidelity and increased translesion synthesis capacity. *Nucl. Acids Res.* **36**, 3892-3904. PMID: PMC2475618
296. Arana, M.E., Seki, M., Rogozin, I.B., Wood, R.D. and Kunkel, T.A. (2008) Low fidelity DNA synthesis by human DNA polymerase theta, *Nucleic Acids Res.* **36**, 3847-3856. PMID: PMC2441791
297. Cisneros, G.A., Perera, L., Garcia-Diaz, M., Bebenek, K., Kunkel, T.A. and Pedersen, L.G. (2008) Catalytic mechanism of human DNA polymerase lambda with Mg²⁺ and Mn²⁺ from *ab initio* QM/MM studies. *DNA Repair* **7**, 1824-1834. PMID: PMC2586819
298. Kunkel, T.A. and Burgers, P.M.J. (2008) Dividing the workload at a eukaryotic replication fork. *Trends Cell Biol.* **18**, 521-527. PMID: PMC2665207
299. Nick McElhinny, S.A., Pursell, Z.F. and Kunkel, T.A. (2009) Mechanisms for High Fidelity DNA Replication. In: *Molecular Themes in DNA Replication*, pp. 86-104, Editor by Lynne S. Cox, Published by the Royal Society of Chemistry, Cambridge. No PMID
300. Stone, J.E., Kissling, G.E., Lujan, S.A., Rogozin, I.B., Stith, C.M., Burgers, P.M.J. and Kunkel, T.A. (2009) Low fidelity DNA synthesis by the L979F mutator derivative of *Saccharomyces cerevisiae* DNA polymerases ζ . *Nucl. Acids Res.* **37**, 2830-2840. PMID: PMC2699522
301. McCulloch, S.D., Kokoska, R.J., Garg, P., Burgers, P.M. and Kunkel, T.A. (2009) The efficiency and fidelity of 8-oxo-guanine bypass by DNA polymerases δ and η . *Nucl. Acids Res.* **37**, 3774-3787. PMID: PMC2685079
302. Garcia-Diaz, M., Bebenek, K., Larrea, A., Havener, J.M., Perera, L., Krahn, J., Pedersen, L.C., Ramsden, D.A. and Kunkel, T.A. (2009) Template strand scrunching during DNA gap repair synthesis by human DNA polymerase λ . *Nature Struct. Molec. Biol.* **16**, 967-972. PMID: PMC2767187
303. Terrados, G., Capp, J.-P., Canitrot, Y., Garcia-Diaz, M., Bebenek, K., Kirchoff, T., Villanueva, A., Boudsocq, F., Bergoglio, V., Cazaux, C., Kunkel, T.A., Hoffman, J.-S. and Blanco, L. (2009) Characterization of a natural mutator variant of human DNA

- polymerase lambda which promotes chromosomal instability by compromising NHEJ. *PLoS ONE* **4**, e7290. PMID: PMC2751832
304. Kunkel, T.A. (2009) Evolving views of DNA replication (in)fidelity. Cold Spring Harbor Symposia on Quantitative Biology: Evolution: The Molecular Landscape **LXXIV**, 91-101, Cold Spring Harbor Laboratory Press. PMID: PMC3628614
305. Arana, M.E., Powell, G.K., Edwards, L.L., Kunkel, T.A. and Petrovich, R.M. (2010) Refolding active human DNA polymerase ν from inclusion bodies. *Protein Expression and Purification* **70**, 163-171. PMID: 19853037
306. Kucherlapati, M.H., Lee, K., Nguyen, A., Clark, A.B., Hou Jr., H., Rosulek, A., Li, H., Yang, K., Fan, K., Lipkin, M., Bronson, R.T., Jelicks, L., Kunkel, T.A., Kucherlapati, R. and Edlmann, W. (2010) An Msh2 conditional knockout mouse for studying intestinal cancer and testing anti-cancer agents. *Gastroenterology* **138**, 993-1002. PMID: PMC2862591
307. Arana, M.E., Holmes, S.F., Fortune, J.M., Moon, A.F., Pedersen, L.C. and Kunkel, T.A. (2010) Functional residues on the surface of the N-terminal domain of yeast Pms1. *DNA Repair* **9**, 448-457. PMID: PMC2856611
308. Nick McElhinny, S.A., Watts, B.E., Kumar, D., Watt, D. L., Lundström, E-B., Burgers, P.M.J., Johansson, E., Chabes, A. and Kunkel, T.A. (2010) Abundant ribonucleotide incorporation into DNA by yeast replicative DNA polymerases. *Proc. Natl. Acad. Sci. U.S.A.*, **107**, 4949-4954. PMID: PMC2841928
309. Takata, K., Arana, M.E., Seki, M., Kunkel, T.A. and Richard D. Wood, R.D. (2010) Evolutionary conservation in vertebrate *POLN* of a residue controlling low fidelity and bypass activity. *Nucl. Acids Res.* **38**, 3233-3244. PMID: PMC2879524
310. Garcia-Diaz, M., Murray, M.S., Kunkel, T.A. and Chou, K-M. (2010) Interaction between DNA polymerase lambda and anticancer nucleoside analogs. *J. Biol. Chem.* **285**, 16874-16879. PMID: PMC2878035
311. Bebenek, K., Garcia-Diaz, M.D., Zhou, R-Z., Povirk, L.F. and Kunkel, T.A. (2010) Loop 1 modulates the fidelity of DNA polymerase λ . *Nucl. Acids Res.* **38**, 5419-5431. PMID: PMC2938210
312. Larrea, A.A., Lujan, S.A. and Kunkel, T.A. (2010) SnapShot: DNA Mismatch Repair. *Cell* **141**, 730-730.e1. PMID: 20478261
313. Smogorzewska, A., Desetty, R., Saito, T., Schlabach, M., Lach, F.P., Sowa, M.E., Clark, A.B., Kunkel, T.A., Harper, J.W., Colaiácovo, M.P., and Elledge, S.J. (2010) A genetic screen identifies FAN1, a Fanconi anemia-associated nuclease necessary for DNA interstrand crosslink repair. *Molec. Cell* **39**, 36-47. PMID: PMC2919743
314. Nick McElhinny, S.A., Kumar, D., Clark, A.B., Watt, D.L., Watts, B.E., Lundström, E-B., Johansson, E., Chabes, A. and Kunkel, T.A. (2010) Genome instability due to ribonucleotide incorporation into DNA. *Nature Chemical Biology* **6**, 774-781. PMID: PMC2942972

315. Larrea, A.A., Lujan, S.A., Nick McElhinny, S.A., Mieczkowski, P.A., Resnick, M.A., Gordenin, D.A. and Kunkel, T.A. (2010) A genome wide model for the normal eukaryotic DNA replication fork. *Proc. Natl. Acad. Sci. U.S.A.* **107**, 17674-17679. PMID: PMC2955150
316. Aksenova, A., Volkov, K., Maceluch, J., Pursell, Z.F., Rogozin, I.B., Kunkel, T.A., Pavlov, Y.I. and Johansson, E. (2010) Mismatch repair-independent increase in spontaneous mutagenesis in yeast lacking non-essential subunits of DNA polymerase ϵ . *PLoS Genetics* **6**, 1-11, e1001209. PMID: PMC2987839
317. Arana, M.E. and Kunkel, T.A. (2010) Mutator phenotypes due to replication infidelity. *Seminars in Cancer Biology* **20**, 304-311. PMID: PMC3087159
318. Nick McElhinny, S.A., Kissling, G.E. and Kunkel, T.A. (2010) Differential correction of lagging strand DNA replication errors made by DNA polymerases α and δ . *Proc. Natl. Acad. Sci. U.S.A.* **107**, 21070-21075. PMID: PMC3000245
319. Clark, A.B. and Kunkel, T.A. (2010) The importance of being DNA. *Cell Cycle* **9**, 4422-4424. PMID: PMC3603967
320. Guan, L., Bebenek, K., Kunkel, T.A. and Greenberg, M.M. (2010) Inhibition of short patch and long patch base excision repair by an oxidized abasic site. *Biochemistry* **49**, 9904-9910. PMID: PMC2976803
321. Kumar, D., Abdulovic, A.L., Viberg, J., Nilsson, A.K., Kunkel, T.A. and Chabes, A. (2011) Mechanisms of mutagenesis *in vivo* due to imbalanced dNTP pools. *Nucl. Acids Res.* **39**, 1360-1371. PMID: PMC3045583
322. Abdulovic, A.L., Hile, S.E., Kunkel, T.A. and Eckert, K.A. (2011) The *in vitro* fidelity of yeast DNA polymerase δ and polymerase ϵ holoenzymes during dinucleotide microsatellite DNA synthesis. *DNA Repair* **10**, 497-505. PMID: PMC3121764
323. Bebenek, K., Pedersen, L.C. and Kunkel, T.A. (2011) Replication infidelity via a mismatch with Watson-Crick geometry. *Proc. Natl. Acad. Sci. U.S.A.* **108**, 1862-1867. PMID: PMC3033279
324. Clark, A.B., Lujan, S.A., Kissling, G.E. and Kunkel, T.A. (2011) Mismatch repair-independent tandem repeat sequence instability resulting from ribonucleotide incorporation by DNA polymerase ϵ . *DNA Repair* **10**, 476-482. PMID: PMC3652408
325. Schorzman, A.N., Perera, L., Cutalo, J.M., Pedersen, L.C., Pedersen, L.G., Kunkel, T.A. and Tomer, K.B. (2011) Modeling of the DNA-binding site of yeast PMS1 by mass spectrometry. *DNA Repair* **10**, 454-465. PMID: PMC3084373
326. Castellini, M.A., Buguliskis, J.S., Casta, L.J., Butz, C.E., Clark, A.B., Kunkel, T.A., and Taraschi, T. F. (2011) Malaria drug resistance is associated with defective DNA mismatch repair. *Molec. Biochem. Parasit.* **177**, 143-147. PMID: PMC3075314
327. Williams, R.S. and Kunkel, T.A. (2011) FEN Nucleases: Bind, Bend, Fray, Cut. *Cell* **145**, 171-172. PMID: PMC3515068
328. Jirawatnotai, S., Hu, Y., Michowski, W., Elias, J.E., Becks, L., Bienvenu, F., Zagodzdon, A., Goswami, T. Wang, Y.E., Clark, A.B., Kunkel, T.A., van Harn, T., Xia, B., Correll,

- M., Quackenbush, J., Livingston, D.M., Gygi, S.P. and Sicinski, P. (2011) A function for cyclin D1 in DNA repair uncovered by interactome analyses in human cancers. *Nature* **474**, 230-234. PMID: PMC3134411
329. Baar, C., d'Abbadie, M., Vaisman, A., Arana, M.E., Hofreiter, M., Woodgate, R., Kunkel, T.A., and Holliger, P. (2011) Molecular breeding of polymerases for resistance to environmental inhibitors. *Nucl. Acids Res.* **39**, e51. PMID: PMC3082909
330. García-Ortiz, M.V., Marsin, S., Arana, M.E., Gasparutto, D., Guérois, R., Kunkel, T.A. and Radicella, J.P. (2011) Unexpected role for *Helicobacter pylori* DNA polymerase I as a source of genetic variability. *PLoS Genetics* **7**, e1002152. PMID: PMC3121766
331. Kim, N., Huang, S., Williams, J.S., Li, Y.C., Clark, A.B., Cho, J.-E., Kunkel, T.A., Pommier, Y. and Jinks-Robertson, S. (2011) Mutagenic processing of ribonucleotides in DNA by yeast topoisomerase 1. *Science* **332**, 1561-15664. PMID: PMC3380281
332. Stone, J.E., Kumar, D., Binz, S.K., Inase, A., Iwai, S., Chabes, A., Burgers, P.M., and Kunkel, T.A. (2011) Lesion bypass by *Saccharomyces cerevisiae* Pol ζ alone. *DNA Repair* **10**, 826-834. PMID: PMC3146559
333. Watt, D.L., Johansson, E., Burgers, P.M. and Kunkel, T.A. (2011) Replication of ribonucleotide-containing DNA templates by yeast replicative polymerases. *DNA Repair* **10**, 897-902. PMID: PMC3147116
334. Kunkel, T.A. (2011) Balancing eukaryotic replication asymmetry with replication fidelity. *Curr. Opin. Chem. Biol.* **15**, 620-626. PMID: PMC3189284
335. Arana, M. E., Potapova, O., Kunkel, T.A. and Joyce, C. M. (2011) Kinetic analysis of the unique error signature of human DNA polymerase ν . *Biochemistry* **50**, 10126-10135. PMID: PMC3235957
336. Miyabe, I., Kunkel, T.A. and Carr, A.M. (2011) The major roles of DNA polymerases epsilon and delta at the eukaryotic replication fork are evolutionarily conserved. *PLoS Genetics*, **7**, e1002407. PMID: PMC3228825
337. Daly, J., Bebenek, K., Watt, D.L., Richter, K., Jiang, C., Zhao, M.-L., Ray, M., McGregor, W.G., Kunkel, T.A. and Diaz, M. (2012) Altered Ig hypermutation pattern and frequency in complementary mouse models of DNA polymerase ζ activity. *J. Immunology* **188**, 5528-5537. PMID: PMC3358437
338. Lazzaro, F., Novarina, D., Amara, F., Watt, D.L., Stone, J.E., Costanzo, V., Burgers, P.M., Kunkel, T.A., Plevani, P. and Muzi-Falconi, M. (2012) RNase H and post-replication repair protect cells from ribonucleotides incorporated in DNA. *Molecular Cell* **45**, 99-110. PMID: PMC3262129
339. DeRose, E., Perera, L., Murray, M.S., Kunkel, T.A. and London, R.E. (2012) Solution structure of the Dickerson DNA dodecamer containing a single ribonucleotide. *Biochemistry* **51**, 2407-2416. PMID: 22390730
340. Gosavi, R.A., Moon, A.F., Kunkel, T.A., Pedersen, L.C. and Bebenek, K. (2012) The catalytic cycle for ribonucleotide incorporation by a variant of human DNA polymerase λ . *Nucl. Acids Res.* **40**, 7518-7527. PMID: PMC3424563

341. Williams, J.S., Clausen, A.R., Nick McElhinny, S.M., Watts, B.E., Johansson, E. and Kunkel, T.A. (2012) Proofreading of ribonucleotides inserted into DNA by yeast DNA polymerase ϵ . *DNA Repair* **11**, 649-656. PMID: PMC3407341
342. Sparks, J.L., Chon, H., Cerritelli, S.M., Kunkel, T.A., Johansson, E., Crouch, R.J. and Burgers, P.M. (2012) RNase H2-Initiated Ribonucleotide Excision Repair. *Molecular Cell* **47**, 980-986. PMID: PMC3470915
343. Stone, J.E., Lujan, S.A. and Kunkel, T.A. (2012) Characterization of mutation clusters created by wild type and L979F DNA polymerase zeta when bypassing spontaneous DNA damage in *Saccharomyces cerevisiae*. *Environmental and Molecular Mutagenesis* **53**, 777-786. PMID: PMC3678557
344. Lujan, S.A., Williams, J.S., Pursell, Z.F., Abdulovic-Cui, A.A., Clark, A.B., Nick McElhinny, S.A. and Kunkel, T.A. (2012) Mismatch repair balances leading and lagging strand replication fidelity. *PLoS Genetics* **8**, e1003016. PMID: PMC3469411
345. Arana, M.E., Kerns, R.T., Wharey, L., Gerrish, K.E., Bushel, P.R. and Kunkel, T.A. (2012) Transcriptional responses to loss of RNase H2 in *Saccharomyces cerevisiae*. *DNA Repair* **11**, 933-941. PMID: PMC3535280
346. Liberti, S.E., Larrea, A.A. and Kunkel, T.A. (2013) Exonuclease 1 preferentially repairs mismatches generated by DNA polymerase α . *DNA Repair* **12**, 92-96. PMID: PMC3552065
347. Clausen, A.R., Zhang, S., Burgers, P.M., Lee, M.Y. and Kunkel, T.A. (2013) Ribonucleotide incorporation, proofreading and bypass by human DNA polymerase δ . *DNA Repair* **12**, 121-127. PMID: PMC3552135
348. Stevens, A.J., Guan, L., Bebenek, K., Kunkel T.A. and Greenberg, M.M. (2013) DNA polymerase lambda inactivation by oxidized abasic sites. *Biochemistry* **52**, 975-983. PMID: PMC3566640
349. Williams, J.S., Smith, D.J., Marjavaara, L., Lujan, S.A., Chabes, A. and Kunkel, T.A. (2013) Topoisomerase 1-mediated removal of ribonucleotides from nascent leading strand DNA. *Molecular Cell* **49**, 1010-1015. PMID: PMC3595360
350. Lujan, S.A., Williams, J.S., Clausen, A.R., Clark, A.B. and Kunkel, T.A. (2013) Ribonucleotides are signals for mismatch repair of leading strand replication errors. *Molecular Cell* **50**, 437-443. PMID: PMC3658170
351. Schaetzlein, S., Chahwan, R., Avdievich, E., Roa, S., Wei, K., Eoff, R.L., Sellers, R.S., Clark, A.B., Kunkel, T.A., Scharff, M.D. and Edelman, W. (2013) Mammalian *Exo1* encodes both structural and catalytic functions that play distinct roles in essential biological processes. *Proc. Natl. Acad. Sci. U.S.A.* **110**, E2470-E2479. PMID: PMC3704034
352. Lormand, J., Buncher, N., Murphy, C.T., Kaur, P., Lee, M.Y., Burgers, P., Wang, H., Kunkel, T.A. and Opresko, P.L. (2013) DNA polymerase δ stalls on telomeric lagging strand templates independently from G-quadruplex formation. *Nucleic Acids Research* **41**, 10323-10333. PMID: PMC 3905856

353. Clausen, A.R., Murray, M.S., Passer, A.R., Pedersen, L.C. and Kunkel, T.A. (2013) Structure-function analysis of ribonucleotide bypass by B family DNA replicases. *Proc. Natl. Acad. Sci. U.S.A.* **110**, 16802-16807. PMID: PMC 3801065
354. Tumbale, P., Williams, J.S., Schellenberg, M.J., Kunkel, T.A. and Williams, R.S. (2014) Aprataxin resolves adenylated RNA-DNA junctions to maintain genome integrity. *Nature* **506**, 111-115. PMID: PMC406939
355. Moon, A.F., Pryor, J.M., Ramsden, D.A., Kunkel, T.A., Bebenek, K. and Pedersen, L.C. (2014) Sustained active site rigidity during synthesis by human DNA polymerase μ . *Nature Struct. Molec. Biol.* **21**, 253-260. PMID: PMC4164209
356. Bebenek, K., Pedersen, L.C. and Kunkel, T.A. (2014) Structure-functions studies of DNA polymerase lambda. *Biochemistry* **53**, 2781-2792. PMID: PMC4018081
357. Mejia, E., Burak, M., Alonso, A., Larraga, V., Kunkel, T.A., Bebenek, K. and Garcia-Diaz, M. (2014) Structures of the *Leishmania infantum* polymerase beta. *DNA Repair* **18**, 1-9. PMID: PMC4040948
358. Williams, J.S. and Kunkel, T.A. (2014) Ribonucleotides in DNA: Origins, repair and consequences. *DNA Repair* **19**, 27-37. PMID: PMC4065383
359. Makarova, A.V., Nick McElhinny, S.A., Watts, B.E., Kunkel, T.A. and Burgers, P.M. (2014) Ribonucleotide incorporation by yeast DNA polymerase ζ . *DNA Repair* **18**, 63-67. PMID: PMC4402711
360. Kunkel, T.A. and Burgers, P.M. (2014) Delivering non-identical twins. *Nature Struct. Molec. Biol.* **21**, 649-651. PMID: PMC---
361. Lujan, S.A., Clausen, A.R., Clark, A.B., MacAlpine, H.K., MacAlpine, D.M., Malc, E.P., Mieczkowski, P.A., Burkholder, A.B., Fargo, D.C., Gordenin, D.A. and Kunkel, T.A. (2014) Heterogeneous polymerase fidelity and mismatch repair bias genome variation and composition. *Genome Research* **24**, 1751-1764. PMID: PMC 4216917
362. Buckland, R.J., Watt, D.L., Chitoor, B., Nilsson, A.K., Kunkel, T.A. and Chabes, A. (2014) Increased and imbalance dNTP pools symmetrically promote both leading and lagging strand replication infidelity. *PLOS Genetics* **10**, e1004846. PMID: PMC4256292
363. Van, C. Williams, J.S., Kunkel, T.A. and Peterson, C.L. (2015) Deposition of histone H2A.Z by the SWR-C remodeling enzyme prevents genome instability. *DNA Repair* **25**, 9-14. PMID: PMC4276476
364. Clausen, A.R., Williams, J.S. and Kunkel, T.A. (2015) Measuring ribonucleotide incorporation into DNA *in vitro* and *in vivo*. *Methods in Molecular Biology*, Vol. 1300, 123-139, Chapter 9. Vengrova, Sonya, Dalgaard, Jacob (Eds.), Humana Press.
365. Clausen, A.R., Lujan, S.A., Burkholder, A.B., Orebaugh, C.D., Williams, J.S., Clausen, M.F., Malc, E.P., Mieczkowski, P.A., Fargo, D.C., Smith, D.J. and Kunkel, T.A. (2015) Tracking replication enzymology *in vivo* by genome-wide mapping of ribonucleotide incorporation. *Nature Structural Molecular Biology* **22**, 185-191. PMID: PMC4351163

366. Martínez-Jiménez, M.I., García-Gómez, S., Bebenek, K., Sastre-Moreno, G., Calvo, P., Diaz-Talavera, A., Kunkel, T.A. and Blanco, L. (2015) Alternative solutions and new scenarios for translesion DNA synthesis by human PrimPol. *DNA Repair*, 129-137.
367. Williams, J.S., Clausen, A.R., Marjavaara, L., Clark, A.B., Burgers, P.M., Chabes, A. and Kunkel, T.A. (2015) Evidence that processing of ribonucleotides in DNA by topoisomerase 1 is leading strand-specific. *Nature Structural Molecular Biology* **22**, 291-297. PMID: PMC4835660
368. Liu, S., Lu, G., Ali, S., Liu, W., Zheng, L. Dai, H., Li, H., Hu, H., Hua, Y., Zhou, Y., Ortega, J., Li, G.-M., Kunkel, T.A. and Shen, B. (2015) Okazaki fragment maturation involves alpha-segment error editing by the mammalian FEN1/MutSalph functional complex. *EMBO Journal* **34**, 1829-1843. PMID: PMC4516434.
369. Lujan, S.A., Clark, A.B. and Kunkel, T.A. (2015) Differences in genome-wide repeat sequence instability conferred by defects in proofreading and mismatch repair defects. *Nucleic Acids Research* **43**, 4067-4074. PMID: PMC4417177
370. St. Charles, J., Williams, J.S., Lujan, S.A., Chabes, A. and Kunkel, T.A. (2015) Quantifying base selectivity, proofreading and mismatch repair during nuclear DNA replication in *Saccharomyces cerevisiae*. *DNA Repair* **31**, 41-51. PMID: PMC4465240
371. Moon, A.F., Gosavi, R., Kunkel, T.A., Pedersen, L.C. and Bebenek, K. (2015) Creative template-dependent synthesis by DNA polymerase mu. *Proc. Natl. Acad. Sci. U.S.A.* **112**, E4530-6. PMID: PMC 4547271
372. Kunkel, T.A. and Erie, D.E. (2015) Eukaryotic mismatch repair in relation to replication. *Annual Reviews Genetics* **49**, 291-313.
373. Kunkel, T.A. (2015) Celebrating DNA's Repair Crew. *Cell* **163**, 1301-1303.
374. Conover, H.N., Lujan, S.A., Chapman, M.J., Cornelio, D.A., Sharif, R., Williams, J.S., Clark, A.B., Camilo, F., Thomas A. Kunkel, T.A. and Argueso, J.L. (2015) Stimulation of chromosomal rearrangements by ribonucleotides. *Genetics* **201**, 951-961. PMID: PMC4649663
375. Miyabe, I., Mizuno, K., Keszthelyi, A., Daigaku, Y. Skouteri, M., Mohebi, S., Kunkel, T.A., Murray, J.M. and Carr, A.M. (2015) Polymerase δ replicates both strands after homologous recombination-dependent fork restart. *Nature Structural Molecular Biology* **22**, 932-939. PMID: PMC4655445
376. Lujan, Lujan, S.A., Williams, J.S. and Kunkel, T.A. (2016) Eukaryotic genome instability in light of asymmetric DNA replication. *Critical Reviews of Biochemistry and Molecular Biology*, **51**, 43-52. PMID: PMC4922258
377. Watt, D.L., Buckland, R.J., Lujan, S.A., Kunkel, T.A. and Chabes, A. (2016) Genome-wide analysis of the specificity and mechanisms of replication infidelity driven by imbalanced dNTP pools. *Nucleic Acids Research* **44**, 1669-1680. PMID: PMC4770217
378. Burgers, P.M.J., Gordenin, D. and Kunkel, T.A. (2016) Who is leading the replication fork, Pol ϵ or Pol δ ? *Molecular Cell* **61**. 492-493. PMID: PMC4838066

379. Williams, J.S., Lujan, S.A and Kunkel, T.A. (2016) Processing ribonucleotides incorporated during eukaryotic DNA replication. *Nature Reviews Molecular Cellular Biology* **17**, 350 - 363.
380. Lujan, S.A., Williams, J.S and Kunkel, T.A. (2016) DNA polymerases divide the labor of genome replication. *Trends in Cell Biology* **26**, 640-654. PMID: PMC4993630
381. Orebaugh, C.D., Lujan, S.A., Burkholder, A.B., Clausen, A. R. and Kunkel, T.A. (2017) Mapping ribonucleotides incorporated into the yeast genome during nuclear DNA replication by Hydrolytic End-Sequencing (HydEn-seq). *Methods in Molecular Biology, Genome Instability: Methods and Protocols*, Eds. Muzi-Falconi, Brown, G.W., in press.
382. Huang, S.N., Williams, J.S., Ghosh, S., Arana, M.E., Kunkel, T.A. and Pommier, Y. (2017) Double-strand beaks are formed by topoisomerase 1 cleavage at unrepaired ribonucleotides in DNA. *EMBO Journal*, **36**, 361 – 373. PMID: PMC5286372
383. Williams, J.A and Kunkel, T.A. (2017) Studying topoisomerase 1-mediated damage at genomic ribonucleotides. *Methods in Molecular Biology, Methods and Protocols*, Springer Verlag, in press.
384. Williams, J.A., Gehle, D. and Kunkel, T.A. (2017) The role of RNase H2 in processing ribonucleotides incorporated during DNA replication. *DNA Repair*, **53**, 52 – 58. PMID: PMC5409533
385. Burgers, P.M., and Kunkel, T.A. (2017) Eukaryotic DNA Replication Fork. *Annu Rev Biochemistry*, **86**, 417-438. PMID: PMC5597965
386. Kunkel, T.A. and Burgers, P.M.J. (2017) Arranging eukaryotic nuclear DNA polymerases for replication. *BioEssays*, **39**, 8, 1700070
387. Moon, A., Pryor, J., Ramsden, D., Kunkel, T., Bebenek, K. and Pedersen, L. (2017) Structural accommodation of ribonucleotide incorporation by the DNA repair enzyme polymerase mu. *Nucleic Acids Research* **45**, 9138-9148. PMID: PMC5587726
388. Jansen, J., Beard, W.A., Pedersen, L., Shock, D., Moon, A., Krahn, J., Bebenek, K., Kunkel, T.A. and Wilson. S.H. (2017) Time-lapse crystallography snapshots of a double-strand break repair polymerase in action. *Nature Communications* **8**, 253-263. PMID: PMC5557891.
389. Garbacz, M.A., Lujan, S.A., Burkholder, A.B., Cox, P.B., Wu, Q., Zhou, Z., Haber, J.E. and Kunkel, T.A. (2018) Evidence that DNA polymerase δ contributes to initiation of leading strand DNA replication in *Saccharomyces cerevisiae*. *Nature Communications* **9**, 858.
390. Moon, A.F., Tumbale, P.P., Schellenberg, M.J., Williams, R. S., Williams, J.G., Kunkel, T.A., Pedersen, L.C. and Bebenek, K. (2018) Crystal structures of DNA-bound human Ligase IV reveal key insights into substrate binding and catalysis. *Nature Communications* **8**, 253-264.
391. Burkholder, A.B., Lujan, S.A., Lavender, C.A., Grimm, S.A., Kunkel, T.A. and Fargo, D.C. (2018) Muver, a computational framework for accurately calling accumulated mutations. *BMC Genomics* **19**, 345-363.

392. Zhou, Z., Williams, J.A. and Kunkel, T.A. (2018) Ribonucleotides in the yeast genome and measuring ribonucleotide-induced mutagenesis. *JoVE* 137, e58020, pages 1-9.
393. Kunkel, T.A. (2018) A simple but profound mutation in mouse DNA polymerase ϵ drives tumorigenesis. *J. Clinical Investigation* **128**, 3754 - 3756.
394. Hiller, B., Hoppe, A., Haase, C., Hiller, C., Schubert, N., Müller, W., Reijns, M.A.M., Jackson, A.P., Kunkel, T.A., Wenzel, J., Behrendt, R. and Roers, A. (2018) Ribonucleotide excision repair is essential to prevent squamous cell carcinoma of the skin. *Cancer Research* **78**, 5917 – 5926.
395. Aden, K., Bartsch, K., Dahl, J., Reijns, M.A.M., Esser, D., Sheibani-Tezerji, R., Sinha, A., Wottawa, F., Ito, G., Mishra, N., Knittler, K., Burkholder, A., Welz, L., van Es, J., Tran, F., Lipinski, S., Kakavand, N., Boeger, C., Lucius, R., von Schoenfels, W., Schafmayer, C., Lenk, L., Chalaris, A., Clevers, H., Rocken, C., Kaleta, C., Rose-John, S., Schreiber, S., Kunkel, T.A., Rabe, B. and Rosenstiel, P. (2018) Epithelial RNaseH2b maintains genomic integrity and prevents intestinal tumorigenesis in mice. *Gastroenterology* **156**, 145-159. PMID: PMC6311085.
396. Garbacz, M.A., Cox, P.B., Sharma, S., Lujan, S.A., Chabes, A. and Kunkel, T.A. (2019) The absence of the catalytic domains of *Saccharomyces cerevisiae* DNA polymerase ϵ strongly reduces DNA replication fidelity. *Nucleic Acids Research* **47**, 3986-3995.
397. Garbacz, M.A., Lujan, S.A. and Kunkel, T.A. (2019) Lessons from studying the budding yeast *pol2-16* mutant. *Current Genetics*, on line.
398. Williams, J.S., Lujan, S.A., Burkholder, A.B., Clark, A.B., Fargo, D.C. and Kunkel, T.A. (2019) Genome-wide mutagenesis resulting from topoisomerase 1-processing of unrepaired ribonucleotides in DNA. *DNA Repair* **84**, on line
399. Kaminski, A.M., Chiruvella, K.K., Ramsden, D.A., Kunkel, T.A., Bebenek, K. and Pedersen, L.C. (2019) Unexpected behavior of DNA polymerase mu opposite template 8-oxo-7,8-dihydro-2'-guanosine. *Nucleic Acids Research* **47**, 9410-9422.
400. Donnianni, R. A., Zhou, Z., Lujan, S.A., Kunkel, T.A. and Symington, L.S. (2019) DNA polymerase δ synthesizes both DNA strands during break-induced replication. *Molecular Cell* **76**, 371-381.
401. Zhou, Z., Lujan, S.A., Burkholder, A.B., Garbacz, M.A. and Kunkel, T.A. (2019) Roles for DNA polymerase δ in initiating and terminating leading strand replication. *Nature Communications*, on line.

PATENT:

Kunkel, T.A. (1989) Process for site-specific mutagenesis without phenotypic selection. United States Patent 4,873,192

INVITED PRESENTATIONS

From October, 2017 (my last review by Board of Scientific Counselors) to the present:

Lineberger Cancer Center Symposium entitled “Genome Instability in Cancer: Mechanisms and Therapeutic Opportunities”. University of North Carolina, Chapel Hill, NC, April, 2018
 Gordon Research Conference on Mutagenesis and Genome Alterations, Newry ME, June, 2018
 Cold Spring Harbor Meeting on DNA Replication, CSH, NY, September, 2019
 Symposium to Honor Nobel Laureate Paul Modrich, Environmental Mutagenesis and Genomics Society Meeting, Washington D.C., September, 2019
 Keynote Address at the Environmental Mutagenesis and Genomics Society Meeting, Washington D.C., September, 2019
 DNA Replication Meeting, Atami, Japan, March, 2020
 Genetic Toxicology Association Annual Meeting, University of Delaware, May, 2020
 FASEB Summer Research Conference on Dynamic DNA Structures in Biology, Oak Island Resort and Conference Center, Nova Scotia, June, 2020
 Gordon Research Conference on Mutagenesis, Newry, ME, June, 2020
 Keynote Address, 6th DNA Polymerase Meeting, Stockholm, Sweden, September, 2020
 Fujihara Seminar, Hokkaido Japan, September, 2020

INVITED PRESENTATIONS AT UNIVERSITIES AND OTHER INSTITUTIONS

From October, 2017 (my last BSC review) to the present:

University of Kansas, Kansas City, MI	November, 2017
Fels Research Institute, Philadelphia, PA	November, 2017
University of Texas Southwestern, Dallas, TX	January, 2018
Portland State University, Portland, OR	May, 2018
Institute for Molecular Biology, Mainz, Germany	October, 2019
University of Texas at Austin, Austin, Texas	March, 2020