

Curriculum Vitae

MICHAEL WILLIAM GRAY

Professor Emeritus,
Department of Biochemistry and Molecular Biology,
Dalhousie University,
Halifax, Nova Scotia B3H 4R2.

Departmental Website: <http://www.biochem.dal.ca/faculty-staff/faculty/gray.php>

Google Scholar: <https://scholar.google.ca/citations?user=0ypemWUAAAAJ&hl=en&oi=ao>

PERSONAL DETAILS

b. July 18, 1943; Medicine Hat, Alberta

Canadian citizen

m. Jean Dorothy Gillis; daughters Jennifer Lynn and Meghan Ellen

EDUCATION

1. Undergraduate

- B.Sc. (Honors) in Biochemistry, University of Alberta, Edmonton; 1964; graduated *magna cum laude*

2. Graduate

- Ph.D. in Biochemistry, University of Alberta, Edmonton, 1968
- specialization in the biochemistry of nucleic acids
- thesis: *5-Carboxymethyluridine, a Novel Nucleoside Derived from Yeast and Wheat Embryo Transfer RNA* (B.G. Lane, supervisor)

3. Post-Doctoral

- National Research Council of Canada Fellow in radiobiology research, 1968-70, Department of Radiology, Stanford University School of Medicine
- Research (under K.C. Smith) concerned with elucidation of chemical nature of lesions produced in *E. coli* DNA by ultraviolet radiation, and of enzymatic mechanisms for repair of such lesions

ACADEMIC APPOINTMENTS

Assistant Professor, Department of Biochemistry, Dalhousie University, July 1, 1970
 Permanent tenure, July 1, 1972
 Promotion to Associate Professor, Jan. 1, 1977
 Professeur Invité, Université de Paris-Sud, Centre d'Orsay, Biologie Moléculaire
 Végétale, Feb., 1983
 Promotion to Full Professor, July 1, 1983
 Visiting Professor (Genetics Program), Duke University, Durham, North Carolina, Sept.
 1994-Aug. 1995
 Head, Department of Biochemistry and Molecular Biology (July 1, 2004-June 30, 2007)
 Professor Emeritus (January 1, 2009)

SABBATICAL LEAVES

July 1, 1984-June 30, 1985: laboratory of D.A. Clayton, Department of Pathology,
 Stanford University School of Medicine, Stanford, California
 July 1, 1994-June 30, 1995: laboratory of J.E. Boynton (Botany) and N.W. Gillham
 (Zoology), Developmental, Cell and Molecular Biology Group, Duke University,
 Durham, North Carolina

AWARDS AND HONOURS

Province of Alberta Scholarships (1960, 1961, 1963) and Grant (1962)
 University of Alberta First Class Standing Prizes (1961, 1964)
 University of Alberta Honor Prize (1963)
 Bursary, National Research Council of Canada (1964-65)
 Graduate Teaching Assistanceships, Department of Biochemistry (1965-66, 1966-67)
 Dissertation Fellowship, University of Alberta (1967-68)
 Postdoctoral Fellowship, Medical Research Council of Canada (1968) (declined)
 Postdoctoral Fellowship, National Research Council of Canada (1968, 1969)
 Scholarship, Medical Research Council of Canada (1973-78)
 Merit Awards (Full), Dalhousie University (1978, 1981)
 APICS/Fraser Medal, Atlantic Provinces Council on the Sciences (1982)
 Visiting Scientist Award, Medical Research Council of Canada (1984-85)
 Sabbatical Leave Research Grant, Dalhousie University (1984-85)
 Max Forman Research Prize (Senior), Dalhousie Medical Research Foundation (1986)
 Fellowship, Evolutionary Biology Program, Canadian Institute for Advanced Research
 (1987-2007) (named Confederation Fellow, Nov. 25, 1987)
 Boehringer Mannheim Canada Prize, Canadian Biochemical Society (1987)
 Award for Travel to the 14th IUB Congress, American Society for Biochemistry and
 Molecular Biology (1988)
 First Recipient, Award of Merit, Canadian Society for Plant Molecular Biology (1993)
 Sabbatical Leave Research Grant, Dalhousie University (1994-95)

Elected Fellow, Royal Society of Canada, Academy of Sciences (1996)
 Wellcome Visiting Professorship in the Basic Medical Sciences (1998-99),
 Burroughs Wellcome Fund
 Canada Research Chair in Genomics and Genome Evolution (2001-2008)
 Professional of Distinction Finalist, 2006 Discovery Awards for Science and Technology,
 Discovery Centre, Halifax, NS
 Elected Fellow, American Academy of Microbiology (2013)

UNIVERSITY POSITIONS

Member, Career Review Committee (1980)
 Member, President's Advisory Committee on Appointment to Office of the Dean of
 Medicine (1982)
 Member, Senate Discipline Committee (1986-94)
 Member, Radiation Safety Committee (1987-94)
 Member, Vice-President's Investigation Committee Re: Oral Biology (1993)
 Member, Search Committee for the Killam Chair in Neuroscience (1997)
 Senate Representative, University Security and Parking Committee (1999-2001)
 Member, Review Committee, Institute for Research in Materials (2007)
 Member, Dalhousie Rhodes Scholarship Selection Committee (2007)
 Member, Scholarly Integrity Policy Committee (2010-11)

FACULTY POSITIONS

Member, Department of Pediatrics Survey Committee, Faculty of Medicine (1972)
 Chair, Faculty of Medicine Biohazards Committee (1977-78)
 Member, Faculty Council, Faculty of Medicine (1979-82)
 Member, Faculty of Medicine Nominating Committee (1983, 1986)
 Member, *ad hoc* Committee on Central Stores, Faculty of Medicine (1981-84)
 Member, Faculty of Health Professions Tenure and Promotion Committee (1982-83)
 Member, Scientific Advisory Committee, Dalhousie Medical Research Foundation
 (1986-89)
 Member, Ph.D. Panel, Faculty of Graduate Studies (1990-97)
 Member, Long Term Planning Committee, Faculty of Medicine (1991-92)
 Chair, Review and Search Committee, Associate Deanship, Medical Research Services
 (1997-98 and 2000)
 Member, Faculty of Medicine Space Committee (2003-07)
 Member, Review and Search Committee, Associate Deanship, Medical Research
 Services (2004)

COURSES TAUGHT (PRE-RETIREMENT)

Biochemistry 3400A (Nucleic Acids Biochemistry and Molecular Biology)

Biochemistry 5401B (The World of RNA)

SOCIETY MEMBERSHIPS

American Association for the Advancement of Science (AAAS)

American Society for Biochemistry and Molecular Biology (ASBMB)

Canadian Society for Molecular BioSciences (CSMB)

Federation of American Societies for Experimental Biology (FASEB)

American Society for Microbiology (ASM)

EXTRAMURAL PROFESSIONAL SERVICE

Scientific Societies

Member, Nominating Committee, Canadian Biochemical Society (1976-77 and 1979-80)

Treasurer, Local Organizing Committee, 19th Annual Meeting of the Canadian Federation of Biological Societies (CFBS), Dalhousie University, Halifax, Nova Scotia, June 15-18, 1976

Member, Forming Committee, International Society for Plant Molecular Biology (1982)

Member, Forming Committee, Canadian Society for Plant Molecular Biology (CSMPB) (1985)

Vice-President (1986), President (1987) and Past President (1988), CSPMB

Local Organizer, 5th Annual Meeting of the CSPMB, Dalhousie University, Halifax, Nova Scotia, June 11-13, 1990

Member, Royal Society of Canada, Committee for the Evaluation of Molecular Biology (1991-94)

Councilor, Canadian Society for Biochemistry and Molecular Biology (1991-94)

Member, General Meeting Planning Committee, American Society for Microbiology (2013)

Member, Ad Hoc Fellowship Nominations Committee, American Academy of Microbiology (2013)

Member, New Fellows Selection Committee, Life Science Division, Academy III, Royal Society of Canada (2015-2018)

Research Councils and Foundations

Member, Biotechnology Development Grants Committee, Medical Research Council of Canada (1983-84)
 Member, Biochemistry Grants Committee, Medical Research Council of Canada (1988-92)
 Chair, Peer Review Committee, Canadian Genome Analysis and Technology Program (1992-96)
 Member, MRC Standing Committee on Science & Research (1997-2000)
 Member, College of Reviewers, Canada Research Chairs Program (2001-08)
 Member, Review Panel, Interagency NSF/USDA-CSREES Microbial Genome Sequencing Program (2007)

Journal Editorial Boards

Member, Editorial Board, **Plant Science** (1983-87)
 Member, Editorial Board, **The FASEB Journal** (1990-96)
 Coordinating Editor (with R.J. Cedergren, Université de Montréal), **FASEB J. Special Issue** (Jan. 1993), **The New Age of RNA**
 Member, Advisory Board, **Journal of Molecular Evolution** (1991-2000)
 Associate Editor, **Plant Molecular Biology** (1995-99)
 Member, Editorial Board, **Molecular Phylogenetics and Evolution** (1999-2001)
 Founding Editorial Board, **IUBMB Life** (1999)
 Editorial Board, **IUBMB Life** (1999-)
 Coordinating Editor (with W.J. Whelan, F. Vella and A. Azzi), **IUBMB Life Special Issue XIX Congress of the International Union of Biochemistry and Molecular Biology** (July 2003)
 Editorial Board, **BMC Evolutionary Biology** (2005-)
 Editorial Advisory Board, **Versita Open Access Books in Biology** (2012-)
 Editorial Advisory Board, **Protist Genomics** (2012-)
 Editorial Board, **Biology Direct** (2013-)
 Coordinating Editor (with Vamsi K. Mootha, Howard Hughes Medical Institute/Massachusetts General Hospital), **IUBMB Life Special Issue (2018), Evolutionary Mitochondrial Biology**

Advisory Boards

Member, Advisory Board, rRNA Database Project (RDP) (1990)
 Member, Advisory Board, National Research Council Institute for Marine Biosciences (1990-1993)
 Member, Interim Board of Directors, Genome Canada (1999-2000)
 Chair, Science and Industry Advisory Committee (SIAC), Genome Canada (2000-2003)
 Member, Science and Engineering Advisory Council (SEAC), Alberta Ingenuity Fund (2001- 2009)

Member, NHGRI Comparative Genome Evolution Working Group (National Human Genome Research Institute) (2005-2007)
 Chair, Advisory Committee, CIFAR Program in Integrated Microbial Diversity (2007-2017)
 External Examiner, Medical Science Course, Faculty of Medicine and Health Sciences, United Arab Emirates University, Al Ain (June 2008)

Conference Organization

Chairman, Session IX, *Mitochondrial Genome Organization and Expression*, N.A.T.O. Advanced Studies Institute, F.E.B.S. Advanced Course on Genome Organization and Expression in Plants, University of Edinburgh, Edinburgh, Scotland, July 11-21, 1979
 Co-Organizer (with W.F. Doolittle), *The Evolution of the Eukaryotic Genome and Its Components*, Dalhousie University, Halifax, Nova Scotia, July 12-15, 1981
 Chairman, Symposium on *Plant Molecular Biology*, 29th Annual Meeting of the CFBS, Guelph, Ontario, June 16-20, 1986
 Chairman, Symposium on *Chloroplasts: Nuclear and Chloroplast Genomes*, 4th International Congress of Cell Biology, Montreal, Quebec, Aug. 14-19, 1988
 Organizer, Symposium on *Ribosomal RNA: Structure, Function and Evolution*, 33rd Annual Meeting of the CFBS, Dalhousie University, June 14-16, 1990
 Organizer, Symposium on *Origin and Evolution of Mitochondrial and Plastid Genomes*, 4th International Congress of Systematic and Evolutionary Biology, University of Maryland, July 1-7, 1990
 Member, International Board of Advisors, 3rd International Congress of Plant Molecular Biology, Tucson, Arizona, Oct. 6-11, 1991
 Chairman, Session on *Mitochondria: Gene Organization*, 3rd International Congress of Plant Molecular Biology, Tucson, Arizona, Oct. 6-11, 1991
 Organizer, Boehringer-Mannheim Graduate Student Competition, 35th Annual Meeting of the CFBS, Victoria, British Columbia, June 18 (1992)
 Chairman, Session on *Nuclear Encoded Mitochondrial Proteins*, HFSP-Workshop on *RNA Editing in Plant Mitochondria and Chloroplasts - Comparison with RNA Editing Processes in Trypanosomes, Physarum and Mammalia*, Berlin, Germany, Sept. 15-20, 1992
 Co-Organizer (with N. Sando and H. Fukuhara) and Chairman (with J. H. Weil), Symposium on *Organization of Organellar Genome*, XV International Botanical Congress, Yokohama, Japan, Aug. 28-Sept. 3, 1993
 Co-Organizer (with B. Bass) and Chairman (Part B), Sessions on *RNA Editing*, EMBO-CNRS Workshop on *Nucleotide Modification and Base Conversion of RNA*, Aussois, France, May 4-8, 1994
 Co-Organizer (with N. Martin), Round Table Discussion on *Modification versus Editing: Differences and Analogies?* EMBO-CNRS Workshop on *Nucleotide Modification and Base Conversion of RNA*, Aussois, France, May 4-8, 1994
 Chairman, *Endosymbiosis Session 1*, Tenth Biennial Meeting of the ISEP, Dalhousie University, Halifax, Nova Scotia, Aug. 4-10, 1994

- Chairman (with K. Inoue), *Exon III: RNA Processing*, 20th Taniguchi Symposium (Biophysics Division) on *Tracing Biological Evolution in Protein and Gene Structures*, Nagoya, Japan, Oct. 30-Nov. 5, 1994
- Member, Scientific Advisory Committee, *Frontiers in Translation* (International Conference on the *Structure and Function of the Ribosome*), Victoria, B.C., May 20-25, 1995
- Member, Organizing Committee, 16th International tRNA Workshop, University of Wisconsin-Madison, May 27-June 1, 1995
- Co-Organizer (with C.G. Kurland, R. Garrett, P. Forterre and S. Andersson), EMBO Workshop on *Molecular Evolution of Archaeal, Bacterial and Organellar Genomes*, Bålsta, Sweden, Oct. 6-9, 1995
- Member, Canadian Program Committee, 6th Congress of the International Society for Plant Molecular Biology, Québec, Québec, June 18-24 (2000)
- Member, Scientific Program Committee and Chair, Symposium on *Lower Plants and Prokaryotes*, 6th International Congress of Plant Molecular Biology, Québec, Canada, June 18-24, 2000
- Member, Advisory Board, EMBO Workshop on *Origins of Cells and Organelles*, Lund, Sweden, Sept. 8-11, 2000
- Co-Vice-Chair and Session Chair (*tRNA Editing*), Gordon Research Conference on *RNA Editing*, Ventura, California, Jan. 21-26, 2001
- Member, Program Committee and Chair, The CIAR Symposium on *Comparative and Evolutionary Genomics*, 44th Annual Meeting of the Canadian Society for Biochemistry and Molecular & Cell Biology, Alliston, Ontario, May 31-June 3, 2001
- Co-Chair, Gordon Research Conference on *RNA Editing*, Ventura, California, Jan. 19-24, 2003
- Discussion Leader, Session on *Diversity and Evolution of Mechanisms for Editing and Modification*, Gordon Research Conference on *RNA Editing*, Ventura, California, Jan. 23-28, 2005
- Chair, Plenary Session 5 (*Eukaryotic Microbes*), International Conference on Microbial Genomes, Halifax, Nova Scotia, April 13-16, 2005
- Co-Chair (with Vamsi K. Mootha), 115th International Titisee Conference on *Evolutionary Mitochondrial Biology: Molecular, Biochemical, and Metabolic Diversity*, Schwarzwaldhotel Titisee, March 29–April 2, 2017

Manuscript Review (numbers provided from 2012 onward)

	2012	2013	2014	2015	2016	2017	2018	2019
Antonie van Leeuwenhoek J. Microbiology				1				
Biochimie				1				
Biology Direct			1	2	2	1	1	
BioEssays					1			
BMC Biology		1			1			
BMC Evolutionary Biology			1					
BMC Research Notes		1						
Cellular and Molecular Life Science		1						
Current Biology				1	1			1
Eukaryotic Cell			1					
Genome Biology and Evolution		2			1			
ISME Journal		1	1					
IUBMB Life	1	3	3	2	1	2	1	
Journal of Molecular Evolution						1		
Mitochondrion			1					
Molecular Biology and Evolution			2	1				
Nature				1	2	1		
Nucleic Acids Research					1			
PLoS Biology			1					
PLoS ONE			1					
Proc Natl Acad Sci USA	1	2	1	1			1	
RNA	1							
RNA Biology		1						

Grant Application Review (numbers provided for 2008 onward)

	2008	2009	2010	2011	2012	2017	2018
Alberta Advanced Education and Technology		1					
Czech Science Foundation						1	
Knut and Alice Wallenberg Foundation						1	1
NSERC	3						
National Science Foundation (U.S.A)	4						
Wellcome Trust		1					

RESEARCH INTERESTS

Structure, function and evolution of ribosomal and transfer RNAs and their genes; transcription, RNA processing and RNA editing in protist mitochondria; structure, function and evolutionary origin of mitochondrial nucleic acids and proteins, particularly in protists; mitochondrial and nuclear genomics in protists.

RESEARCH FUNDING

Operating Grants:

1. Medical Research Council of Canada/Canadian Institutes of Health Research [MOP-4124, 1970-2009] for research on the project *Structure, Function and Evolution of Mitochondrial Nucleic Acids*. Total funding (1970-2009): \$4,225,740
2. Natural Sciences and Engineering Research Council of Canada [OGP0008387, 1982-91] for research on the project *Ribosomal RNA Genes in Pieces: Structure, Expression and Evolution*. Total funding (1982-91): \$264,820
3. Medical Research Council of Canada/Canadian Institutes of Health Research [MOP-11212, 1991-2006] for research on the project *Ribosomal RNA Structure, Biogenesis and Evolution: Studies of the Eukaryotic rRNA Processing and Modification Machinery*. Total funding (1991-2006): \$1,247,918

Special Project Grants:

1. Medical Research Council of Canada [SP-34/SP-14226, 1992-2002; B.F. Lang (PI), with C. Lemieux and M. Turmel], in support of *The Organelle Genome Megasequencing Program*. Total funding (1992-2002): \$2,995,196
2. Canadian Genome Analysis and Technology Program [GO-12323; B.F. Lang (PI), with R. Cedergren, C. Lemieux and M. Turmel]. Awarded \$233,726 for the *Organelle Genome Megasequencing Project* (1993-96)
3. Canadian Genome Analysis and Technology Program [GO-12984; B.F. Lang (PI), with G. Burger]. Awarded \$388,648 for the *Organelle Genome Database Project* (1995-98)
4. Canadian Institutes of Health Research, Genomics Research Program [GOP-41542; G. Burger (PI), with B.F. Lang]. Awarded \$136,000 (including \$16,000 for equipment) for Pilot Project, *Genomics of Primitive Eukaryotes* (2000-02)

5. Community Sequencing Program, U.S. DOE Joint Genome Institute: J.M. Archibald (PI), with P.J. Keeling, G. McFadden. Sequencing costs for two algal genomes in the project *Impact of Secondary Endosymbiosis on Eukaryotic Genome Evolution and Cell Biology: a Cryptomonad and Chlorarachniophyte Nuclear Genome*
6. U.S. National Human Genome Research Institute: with G. Burger, P. Holland, N. King, B.F. Lang, A. Roger, I. Ruiz-Trillo. Sequencing costs for ten opisthokont/fungal genomes in the project *Animals and Fungi: Common Origin, but Independent Approaches to Multicellularity*
7. Natural Sciences and Engineering Research Council of Canada, Special Research Opportunity Program: Co-PI with J.M. Archibald (PI). Awarded \$219,000 for research project *Impact of Secondary Endosymbiosis on Eukaryotic Genome Evolution* (2008-10)

Contracts:

1. Genome Canada [with A.J. Roger, R.W. Lee, D.G. Durnford, B.F. Lang, G. Burger, R.E. Pearlman, G.B. Golding, P.J. Keeling]. Awarded \$2,902,818 for the *Protist EST Program* (2001-2007) [\$1,746,253 through Genome Atlantic; \$1,156,565 through Génome Québec]

Equipment:

1. MRC, 1976-77, \$19,500, to purchase a multichannel liquid scintillation counter (with R.A. Singer, W.F. Doolittle, S.D. Wainwright, C.W. Helleiner, C. Mezei, M.H. Tan, C.B. Lazier, & F.B. Palmer)
2. MRC, 1981-82, \$27,010, for purchase of Beckman DU-8 uv-visible computing spectrophotometer and accessories (with W.F. Doolittle & S.J. Patrick)
3. MRC, 1984-85, \$100,000, for purchase of centrifuge equipment (with R.W. Chambers, W.F. Doolittle, C.B. Lazier, C. Mezei & R.G. Fenwick)
4. MRC, 1986-87, \$26,150, for purchase of liquid scintillation counter (with C.B. Lazier)
5. DMRF, 1990, \$12,000, partial funding for purchase of DNA synthesizer (with W.F. Doolittle & P.X.-Q. Liu)
6. DMRF, 1991, \$8,578, partial funding for purchase of Beckman model DU-65 uv-visible spectrophotometer

7. Sun Microsystems, 1992, \$62,780, academic equipment grant for purchase of computer hardware and software (with B.F. Lang and G. Burger)
8. DMRF, 1994, \$20,000, for purchase of IEC refrigerated preparative centrifuge
9. MRC, 1996, \$98,745, for purchase of multi-user molecular phosphoimager (with R.W. Currie, T. Hagg, M. Dobson, W.F. Doolittle, F.B. Palmer, H.-S. Ro, R. Singer, C. Too, H. Robertson, N. Tatton, K. Renton, P. Hoffman, G. Johnston & P. Murphy)
10. Sun Microsystems, 1999, \$175,305, academic equipment grant for purchase of computer hardware and software (with B.F. Lang and G. Burger)
11. CFI New Opportunities Fund, 1999, \$100,000 to support establishment of a new laboratory for comparative genomics [with A. Roger (PI) and W.F. Doolittle]
12. CFI Canada Research Chairs Infrastructure Fund, 2001, \$60,691 to purchase instrumentation to establish an enhanced capacity for RNA and protein biochemistry to complement a genomics research program
13. CIHR Multi-user Equipment & Maintenance Grant, 2003, \$469,434 to purchase a multi-user proteomics workstation [with D. M. Byers (PI), S.L. Bearne, R. Duncan, R. Garduno, P.S. Hoffman, T.B. Issekutz, C.R. McMaster and N.D. Ridgway]
14. CIHR Multi-user Equipment & Maintenance Grant, 2004, \$140,183 to purchase a multi-user preparative ultracentrifuge and rotors for biochemical research [with R. Macleod (PI), S.L. Bearne, M. Dobson and K.-L. Too]

Personnel Support:

MRC Biotechnology Training Grant (with R.W. Chambers, W.F. Doolittle, R.G. Fenwick, C.B. Lazier, R.A. Singer & G.C. Johnston), 1983-88.
Support for five research trainees/yr.

GRADUATE THESES SUPERVISED

Ph.D.

R. Scott Cunningham, 1973-1977

A Comparative Study of Wheat Mitochondrial and Cytosol Ribosomal RNA

- APICS Summer Research Scholarships (1971,1972)
- Killam Scholarship (July 1, 1974 – May 31, 1977)

Linda J. Bonen, 1980

Novel Features of Wheat Mitochondrial DNA and its Ribosomal RNA Genes

- Killam Scholarship (1977-80)
- MRC Studentship (1977-80)
- First Recipient of The Max Forman Research Prize (Junior),
Dalhousie Medical Research Foundation (1981)

Murray N. Schnare, 1984

Ribosomal RNA Structure and Evolution Revealed by Nucleotide Sequence Analysis

Poppo H. Boer, 1988

Structure and Expression of Chlamydomonas Mitochondrial Genes: Scrambled Ribosomal RNA Gene Pieces

- Killam Scholarship (1985-86) (declined)
- The Max Forman Research Prize (Junior),
Dalhousie Medical Research Foundation (1987)

Paul B.M. Joyce, 1989

Structure, Organization and Expression of Mitochondrial Transfer RNA Genes in Wheat (Triticum aestivum)

- Studentship, MRC Biotechnology Training Grant (1984-85)
- MRC Studentship (1985-88)
- Walter C. Sumner Memorial Fellowship (1988-89)

James C. Collings, 1991

Genomic Organization of the Nuclear Ribosomal RNA Genes and Primary Sequence Analysis of the Ribosomal Spacer DNA in the Flagellate Protoctist, Crithidia fasciculata

Kim M. Lonergan, 1993

The Ribosomal RNA Gene Region of Acanthamoeba castellanii Mitochondrial DNA: Organization, Mode of Expression and Evolution

- Walter C. Sumner Memorial Fellowship (1990-92)
- First Recipient, Patrick Prize in Biochemistry (1994)

Spencer J. Greenwood, 1994

Ribosomal RNA Processing in Euglena gracilis

- Walter C. Sumner Memorial Fellowship (1991-93)
- President's Graduate Teaching Assistant Award (1994)

Kathleen Glover, 1995

The Genetic Origins of Transfer RNAs in Wheat (Triticum aestivum) Mitochondria

- Walter C. Sumner Memorial Fellowship (1992-94)

David H. Price, 1998

Editing of Transfer RNAs in the Mitochondria of Acanthamoeba castellanii

- NSERC 1967 Science and Engineering Scholarship (1993-97)
- Graduate Entrance Scholarship, Faculty of Medicine, Dalhousie University (1993)
- Izaak Walton Killam Memorial Scholarship, Dalhousie University (1993-96)
- Walter C. Sumner Memorial Fellowship (1997-98)

John E. Norman, 2000

Mitochondrial Genome Organization, Expression and Evolution in the Dinoflagellate, Cryptothecodinium cohnii

- MRC Studentship (1995-98)

Charles E. Bullerwell, 2005

tRNA Editing and Characterization of Novel Small RNAs in Protist Mitochondria

- Studentship, Nova Scotia Health Research Foundation (2003-2005)
- Doug Hogue Award (2003-2004)
- Patrick Prize in Biochemistry (2005)

Timothy E. Shutt, 2006

Origins and Evolution of Mitochondrial Transcription and Replication Machinery

- Patrick Prize in Biochemistry (2007)

Michael J. Charette, 2007

Studies on the Structure, Expression, Genome Organization, and Evolution of U3 snoRNA Genes in Euglena gracilis

- MRC Studentship (1997-2001)
- Governor's Award, Dalhousie University (2004)

Ryan M. R. Gawryluk, 2011

Comparative Proteomics: Studies on the Composition and Evolution of the Mitochondrial Proteome in Eukaryotic Microbes

- NSERC PGSM (2005-07)
- Killam Predoctoral Scholarship (2005-11)
- Dalhousie University President's Award (2007-08)
- NSERC CGSD (2008-10)
- Patrick Prize in Biochemistry (2011)

M.Sc.

Thomas J. Digby, 1989

Studies on Structure and Transcription of Rainbow Trout Mitochondrial DNA

- Studentship, MRC Biotechnology Training Grant (1987-89)

(jointly supervised with C.B. Lazier)

Timothy Chipman, 1998

Studies on Mitochondrial DNA in the Charophycean Alga, Klebsormidium flaccidum

- NSERC Postgraduate Scholarship (1994-95)

- Graduate Entrance Scholarship, Faculty of Medicine, Dalhousie University (1994)

- Killam Scholarship, Dalhousie University (1994)

Elinor T. Schindel, 2004

Editing of Mitochondrial tRNAs in Polysphondylium pallidum

POST-DOCTORAL FELLOWS

David F. Spencer (1978-81)

Linda J. Bonen (1983-85)

- Fellowship, Dalhousie Medical Research Foundation

Taisto Y.K. Heinonen (1985-88)

- NSERC Postdoctoral Fellowship (1985-87)

Pamela Hanic-Joyce (1986-89)

- MRC Postdoctoral Fellowship (1986-89)

Michael B. Coulthart (1987-91)

- Fellowship, MRC Biotechnology Training Grant (1987-89)

- Grant, Research Development Fund, Faculty of Graduate Studies,
Dalhousie University (\$900.00)

Patrick S. Covello (1988-91)

- Fellowship, MRC Biotechnology Training Grant (1988-89)

- Fellowship, Dalhousie Medical Research Foundation (Aug. 1-Dec. 30, 1990)

- The Max Forman Research Prize (Junior),
Dalhousie Medical Research Foundation (1989)

- Grant, Research Development Fund, Faculty of Graduate Studies,
Dalhousie University (\$1,000.00)

Sandra L. Baldauf (1991-93)

- Fellowship in Molecular Studies of Evolution, Alfred P. Sloan Foundation

Tatsuya Ikeda (1992-98)

- Grant, Research Development Fund, Faculty of Graduate Studies,
Dalhousie University (\$1,000.00)

Johan Edqvist (1994-96)

Yoh-ichi Watanabe (1996-2000)

Russell Watkins (2001-06)

Amanda J. Lohan (1999-2007)

Anthony Russell (2000-07)

- Fellowship, Nova Scotia Health Research Foundation (2000-02)

INVITED LECTURES (from 1983)

1983

- Laboratoire de Biologie Moléculaire Végétale, Université de Paris-Sud, Centre d'Orsay, Orsay, France (Feb. 23)
- Institut de Biologie Moléculaire et Cellulaire, Centre National de la Recherche Scientifique, Strasbourg, France (Feb. 25)
- Section for Molecular Biology, Laboratory of Biochemistry, University of Amsterdam, Amsterdam, The Netherlands (Feb. 28)
- Département de Biochimie, Université de Montréal, Montréal, Québec (Aug. 25)
- Department of Biology, Queen's University, Kingston, Ontario (Nov. 17)
- Department of Biology, St. Francis Xavier University, Antigonish, Nova Scotia (Nov. 24) (APICS Tour)
- Department of Biology, University College Cape Breton, Sydney, Nova Scotia (Nov. 25) (APICS Tour)
- Department of Biology, University of Prince Edward Island, Charlottetown, (Dec. 6) (APICS Tour)

1984

- Department of Biology, St. Mary's University, Halifax, Nova Scotia, (Jan. 10) (APICS Tour)
- Memorial University of Newfoundland, St. John's, Newfoundland (Jan. 11) (APICS Tour)
- Department of Biology, Mount St. Vincent University, Halifax, Nova Scotia (Jan. 27) (APICS Tour)
- Department of Biology, Acadia University, Wolfville, Nova Scotia (Feb. 1) (APICS Tour)
- Département de Chimie et Biochimie, Université de Moncton, Moncton, New Brunswick (Feb. 8) (APICS Tour)
- Department of Biology, Mount Allison University, Sackville, New Brunswick (Feb. 8) (APICS Tour)
- Department of Biology, University of New Brunswick, Fredericton, New Brunswick (Feb. 9) (APICS Tour)
- Department of Biology, McGill University, Montreal, Quebec (Feb. 20)
- Nova Scotia Agricultural College, Truro, Nova Scotia (Mar. 2) (APICS Tour)

1985

- Department of Biology, The University of Utah, Salt Lake City, UT (Jan. 31)
- Department of Plant Biology, Carnegie Institution of Washington, Stanford, CA (Feb. 20)
- Department of Biochemistry, University of California, Berkeley CA (Mar. 7)
- Wednesday Evening Evolution Group (WEEG), Center for the Study of Evolution and the Origin of Life (CSEOL), University of California, Los Angeles, CA (May 22)
- College of Biological Sciences, University of Guelph, Guelph, Ontario (Dec. 18)

1986

Department of Microbiology, Dalhousie University, Halifax, Nova Scotia (Mar. 3)
National Research Council, Atlantic Research Lab., Halifax, Nova Scotia (Apr. 29)
Division of Medical Biochemistry, University of Calgary, Calgary, Alberta (Sept. 11)
Department of Botany, University of Toronto, Toronto, Ontario (Sept. 16)
Faculty of Medicine, Dalhousie University, Halifax, Nova Scotia (Nov. 7)
(Max Forman Research Prize [Senior])

1987

Department of Pathology, Tumor Biology Training Program, Stanford University School of
Medicine, Stanford, CA (Mar. 9)
Department of Biology, University of New Brunswick, Fredericton, New Brunswick (Oct. 29)
(APICS 25th Anniversary Lecture)
Division of Sciences, University of New Brunswick, St. John, New Brunswick (Oct. 30) (APICS
25th Anniversary Lecture)

1988

Department of Biology, McMaster University, Hamilton, Ontario (Mar. 28)
Banting and Best Department of Medical Research, University of Toronto, Toronto, Ontario
(Mar. 29)

1989

Département de Biochimie, Université de Montréal, Montréal, Québec (Mar. 28)
Department of Biology, University of Waterloo, Waterloo, Ontario (Mar. 30)
Department of Microbiology, University of Guelph, Guelph, Ontario (Mar. 31)
Department of Biochemistry, Queen's University, Kingston, Ontario (Dec. 6)

1990

Joint Botany-Zoology-Genetic Program Seminar, Duke University, Durham, NC (Apr. 9)
The Rockefeller University, New York, NY (May 14)
Department of Biochemistry, University of Toronto, Toronto, Ontario (Dec. 10)

1991

Biotechnology Laboratory, University of British Columbia, Vancouver, British Columbia (Mar. 21)
Institute of Molecular Biology and Biochemistry, Simon Fraser University, Burnaby, British
Columbia (Mar. 22)
Hudson Mohawk Association Seminar Series, SUNY, Albany, NY (Apr. 15)
Department of Biological Sciences and Center for Molecular Genetics, SUNY, Albany, NY (Apr.
16)
Department of Biochemistry, Memorial University of Newfoundland, St. John's, Newfoundland
(Nov. 18)
Division of Basic Sciences, Faculty of Medicine, Memorial University of Newfoundland, St.
John's, Newfoundland (Nov. 19)

1992

Centre de Recherche en Génétique Moléculaire Végétale, Département de Biochimie, Université Laval, Sainte-Foy, Québec (Feb. 19)
Plant Molecular Biology Seminar Series, Triangle Universities Consortium for Research and Education in Plant Molecular Biology, North Carolina Biotechnology Center, Research Triangle Park, NC (Apr. 13)
Department of Biochemistry, McMaster University, Hamilton, Ontario (May 12)
Molecular, Cellular and Developmental Biology Program, The Ohio State University, Columbus, OH (Nov. 9)
Département de Biochimie, Université de Montréal, Montréal, Québec (Nov. 19)

1993

Departments of Microbiology and Plant Science, Macdonald Campus, McGill University, Ste-Anne-de-Bellevue, Quebec (Apr. 6)
Plant Biotechnology Institute, National Research Council of Canada, Saskatoon, Saskatchewan (May 12)
Institut de Biologie Moléculaire des Plantes, Centre National de la Recherche Scientifique, Strasbourg, France (June 7)

1994

Department of Genetics, University of Alberta, Edmonton, Alberta (Apr. 7) (Alberta Heritage Foundation for Medical Research Visiting Speaker)
Department of Biochemistry, University of Alberta, Edmonton, Alberta (Apr. 8)
Biomedical Center, Uppsala University, Uppsala, Sweden (May 9)
Department of Molecular Biology, Uppsala University, Uppsala, Sweden (May 10)
Department of Microbiology, Umeå University, Umeå, Sweden (May 11)
Institut für Genbiologische Forschung, Berlin, Germany (June 27)
Laboratory of Molecular Biology, Department of Agricultural Chemistry, Kyoto University, Kyoto, Japan (Nov. 7)

1995

Genetics Colloquium, Duke University Graduate Program in Genetics, Duke University, Durham, NC (Jan. 24)
Department of Genetics, North Carolina State University, Raleigh, NC (Mar. 21)
Department of Biochemistry and Molecular Biology, The Pennsylvania State University, Hershey, Pennsylvania (Apr. 24)
Department of Molecular Biology and Microbiology, Case Western Reserve University, Cleveland, Ohio (Apr. 26)

1996

Departments of Microbiology and Zoology, Michigan State University, East Lansing, Michigan (Apr. 18)

1997

Department of Chemistry and Biochemistry, Concordia University, Montreal, QC (February 14)
(University Lecturer Series)

Department of Biology, University of New Brunswick, Fredericton, NB (Mar. 18)

Department of Biological Chemistry, UCLA School of Medicine, Los Angeles, CA (June 5)
(MBI/ACCESS Affinity Group Seminar Series)

Section of Genetics and Development, Cornell University, Ithaca, NY (Oct. 27 & 28)

1998

Department of Biochemistry and Molecular Biology, University of Massachusetts, Amherst, MA
(Apr. 13 & 14)

(i) *Editing of Mitochondrial Transfer RNAs*

(ii) *A Genomics Approach to the Issues of Mitochondrial Origin and Evolution*

Department of Biochemistry, University of Toronto, Toronto, ON (May 11)

Probing the Origin and Evolution of Mitochondria: A Genomics Approach

Department of Biochemistry, McMaster University, Hamilton, ON (May 12)

Probing the Origin and Evolution of Mitochondria: A Genomics Approach

Department of Molecular Biology, Biomedical Center, Uppsala University, Uppsala, Sweden
(June 18 & 22)

(i) *Editing of Transfer RNAs in Acanthamoeba castellanii*

(ii) *Probing the Origin and Evolution of Mitochondria: a Genomics Approach*

Department of Biochemistry, University of Alberta, Edmonton, AB (July 9) (Alberta Heritage
Foundation for Medical Research Visiting Speaker)

RNA Editing and its Evolution

Department of Biology (Friday Informal Seminar Hour), Dalhousie University, Halifax, NS (Oct.
30)

A Genomics Approach to Understanding Mitochondrial Genome Evolution

1999

Centre de Recherche sur la Fonction, la Structure et l'Ingénierie des Protéines (CREFSIP),
Université Laval, Québec, QC (Mar. 10)

Mitochondrial Evolution

Department of Biology, York University, Toronto, ON (Mar. 22-25)

(i) *Ribosomal RNA Processing and Small Nuclear RNAs in Euglena gracilis*

(ii) *RNA Editing and its Evolution*

(iii) *New Twists on Old Paradigms of Mitochondrial Evolution*

(Burroughs Wellcome Fund Visiting Lecture)

2000

Graduate Interdisciplinary Program in Genetics, University of Arizona, Tucson, AZ (Feb. 23)
Mitochondrial Genomics

Department of Biological Chemistry, Johns Hopkins University School of Medicine, Baltimore,
MD (Mar. 28)

Transfer RNA Editing in Acanthamoeba Mitochondria: Mechanism and Evolution

Department of Genetics, Washington University School of Medicine, St. Louis, MO (Mar. 30)

Serendipity in the Euglenozoa: Small Nuclear and Nucleolar RNAs

Center for the Study of Comparative Functional Genomics, The University at Albany, State
University of New York, Albany, NY (Apr. 11)

A Genomics Perspective on Mitochondrial Evolution

2001

Department of Physics, Dalhousie University, Halifax, NS (Jan. 11)
Mitochondrial Evolution

2002

Department of Biology, Mount Allison University, Sackville, NB (Apr. 2)
Origin and Evolution of Mitochondria: a Genomics Approach

Departments of Biology and Molecular Ecology, Lund University, Lund, Sweden (Dec. 3)
A Serendipitous Journey into RNA Editing: Three and a Half Short Tales

2003

School of Biological Sciences, University of Texas, Austin, TX (Mar. 17)
The Mitochondrial Genome: Common Evolutionary Origin, Extraordinarily Variable Structure

2004

Department of Biochemistry and Molecular Biology, University of Miami, Miami, FL (Apr. 16)
A Serendipitous Journey into RNA Editing: Three and a Half Short Tales

B.C. Cancer Research Centre, B.C. Cancer Agency, Vancouver, BC (Sept. 20)
A Serendipitous Journey into RNA Editing: Three and a Half Short Tales

2005

Department of Botany, University of British Columbia, Vancouver, BC (Sept. 20)
Mitochondrial Evolution: Going Off in All Directions

2006

Marine Biological Laboratory, Woods Hole, MA (March 24)
A Serendipitous Journey into RNA Editing: Three and a Half Short Tales

Département de biochimie, Université de Sherbrooke, Sherbrooke, QC (March 29)
A Serendipitous Journey into RNA Editing: Three and a Half Short Tales

2009

Ohio State University RNA Group, Columbus, OH (May 22)
Spectacular and Bizarre: RNA Editing and its Evolution

Department of Biology, University of New Brunswick, Fredericton, NB (November 13)
Two Views of Mitochondrial Evolution: Genomics vs. Proteomics

2013

BTI Distinguished Lecture, Boyce Thompson Institute for Plant Biology, Ithaca, NY (April 3-4)
Mitochondrial Evolution: Genome vs. Proteome
Spectacular and Bizarre: RNA Editing and its Evolution

Department of Biochemistry and Molecular Biology, Dalhousie University, Halifax, NS
The Pre-endosymbiont Hypothesis: an Updated Perspective on the Origin and Evolution of Mitochondria.

2015

MRC Mitochondrial Biology Unit, Cambridge Biomedical Campus, Cambridge, U.K. (March 27)
Mitochondrial Evolution: Genome vs. Proteome

2018

Science Sundays, Ohio State University, Columbus, OH (November 18)

How Did the Powerhouse of the Cell Originate?

Ohio State University RNA Group, Columbus, OH (November 20)

The Unusual Cytoplasmic Ribosome of Euglena gracilis

PUBLICATIONS

(* denotes students, postdoctoral fellows or technical personnel associated with my lab)

Google Scholar Citations:

<http://scholar.google.ca/citations?user=0ypemWUAAA&hl=en&oi=ao>

I. Original Research Contributions

1. COLLIER, H.B. AND **GRAY, M.W.** (1965) Enzyme inhibition by derivatives of phenothiazine. VII. Inhibition of glucose-6-phosphate dehydrogenase activity of rabbit erythrocytes. *Can. J. Biochem.* **43**, 105-110.
[PMID: 14282920](#) [PDF*](#)
2. HUDSON, L., **GRAY, M.** AND LANE, B.G. (1965) The alkali-stable dinucleotide sequences and the chain termini in soluble ribonucleates from wheat germ. *Biochemistry* **4**, 2009-2016.
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3. **GRAY, M.W.** AND LANE, B.G. (1967) Studies of the sequence distribution of 2'-O-methylribose in yeast soluble ribonucleates. *Biochim. Biophys. Acta* **134**, 243-257.
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4. **GRAY, M.W.** AND LANE, B.G. (1968) 5-Carboxymethyluridine, a novel nucleoside derived from yeast and wheat embryo transfer ribonucleates. *Biochemistry* **7**, 3441-3453.
[PMID: 4300701](#) [PDF*](#)
5. *CUNNINGHAM, R.S. AND **GRAY, M.W.** (1974) Derivatives of *N*-[*N*-(9-β-D-ribofuranosylpurin-6-yl)carbamoyl]threonine in phosphodiesterase hydrolysates of wheat embryo transfer ribonucleic acid. *Biochemistry* **13**, 543-553.
[PMID: 4358950](#) [PDF*](#)
6. **GRAY, M.W.** (1974) Dinucleotide sequences containing both base and sugar modifications in the ribosomal RNA of *Crithidia fasciculata*. *Biochim. Biophys. Acta* **374**, 253-257.
[PMID: 4433598](#)
7. **GRAY, M.W.** (1974) A method for the quantitative analysis and preparative isolation of *N*-[*N*-methyl-*N*-(9-β-D-ribofuranosylpurin-6-yl)carbamoyl]threonine - a modified nucleoside present in transfer RNA. *Anal. Biochem.* **62**, 91-101.
[PMID: 4611275](#)
8. **GRAY, M.W.** (1974) The presence of O^{2'}-methylpseudouridine in the 18S + 26S ribosomal ribonucleates of wheat embryo. *Biochemistry* **13**, 5453-5463.
[PMID: 4376017](#) [PDF*](#)
9. **GRAY, M.W.** (1975) Analysis of O^{2'}-methylnucleoside 5'-phosphates in snake venom hydrolysates of RNA: identification of O^{2'}-methyl-5-carboxymethyluridine as a constituent of yeast transfer RNA. *Can. J. Biochem.* **53**, 735-746.
[PMID: 168948](#) [PDF*](#)

10. **GRAY, M.W.** (1976) *O*^{2'}-Methylinosine, a constituent of the ribosomal RNA of *Crithidia fasciculata*. ***Nucleic Acids Res.* 3**, 977-988.
[PMID: 5711](#) [PDF](#)
11. **GRAY, M.W.** (1976) Modified 5'-nucleotides resistant to 5'-nucleotidase: isolation of 3-(3-amino-3-carboxypropyl)uridine 5'-phosphate and *N*²,*N*²-dimethylguanosine 5'-phosphate from snake venom hydrolysates of transfer RNA. ***Can J. Biochem.* 54**, 413-422.
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12. **GRAY, M.W.** (1976) Structural analysis of *O*^{2'}-methyl-5-carbamoylmethyluridine, a newly discovered constituent of yeast transfer RNA. ***Biochemistry* 15**, 3046-3051.
[PMID: 8080](#) [PDF*](#)
13. *CUNNINGHAM, R.S., BONEN, L., DOOLITTLE, W.F. AND **GRAY, M.W.** (1976) Unique species of 5 S, 18 S and 26 S ribosomal RNA in wheat mitochondria. ***FEBS Lett.* 69**, 116-122.
[PMID: 825384](#)
14. BONEN, L., *CUNNINGHAM, R.S., **GRAY, M.W.** AND DOOLITTLE, W.F. (1977) Wheat embryo mitochondrial 18S ribosomal RNA: evidence for its prokaryotic nature. ***Nucleic Acids Res.* 4**, 663-671.
[PMID: 866186](#) [PDF](#)
15. *CUNNINGHAM, R.S. AND **GRAY, M.W.** (1977) Isolation and characterization of ³²P-labeled mitochondrial and cytosol ribosomal RNA from germinating wheat embryos. ***Biochim. Biophys. Acta* 475**, 476-491.
[PMID: 856274](#)
16. **GRAY, M.W.** AND *CUNNINGHAM, R.S. (1977) Hypermodified alkali-stable dinucleotide sequences in each of the high-molecular-weight (26S and 18S) ribosomal RNA species of wheat. ***Can. J. Biochem.* 55**, 582-586.
[PMID: 195686](#) [PDF*](#)
17. **GRAY, M.W.** AND *THOMAS C.A. (1978) Modified 5'-nucleotides: a general procedure for their isolation from phosphodiesterase hydrolysates of transfer RNA. ***Can. J. Biochem.* 56**, 500-507. (G. Malcolm Brown Memorial Issue; invited)
[PMID: 208728](#) [PDF*](#)
18. **GRAY, M.W.** (1979) The ribosomal RNA of the trypanosomatid protozoan *Crithidia fasciculata*: physical characteristics and methylated sequences. ***Can. J. Biochem.* 57**, 914-926. (Charles H. Best Memorial Issue; invited)
[PMID: 476525](#) [PDF*](#)
19. *BONEN, L. AND **GRAY, M.W.** (1980) Organization and expression of the mitochondrial genome of plants. I. The genes for wheat mitochondrial ribosomal and transfer RNA: evidence for an unusual arrangement. ***Nucleic Acids Res.* 8**, 319-335.
[PMID: 6252544](#) [PDF](#)

20. *BONEN, L., *HUH, T.Y. AND **GRAY, M.W.** (1980) Organization and expression of the mitochondrial genome of plants. II. Can partial methylation explain the complex fragment patterns observed when plant mitochondrial DNA is cleaved with restriction endonucleases? *FEBS Lett.* **111**, 340-346.
[PMID: 6244190](#)
21. MACKAY, R.M., **GRAY, M.W.** AND DOOLITTLE, W.F. (1980) Nucleotide sequence of *Crithidia fasciculata* cytosol 5S ribosomal ribonucleic acid. *Nucleic Acids Res.* **8**, 4911-4917.
[PMID: 7443528](#) [PDF](#)
22. MACKAY, R.M., *SPENCER, D.F., DOOLITTLE, W.F. AND **GRAY, M.W.** (1980) Nucleotide sequences of wheat-embryo cytosol 5-S and 5.8-S ribonucleic acids. *Eur. J. Biochem.* **112**, 561-576.
[PMID: 6780349](#) [PDF*](#)
23. **GRAY, M.W.** (1981) Unusual pattern of ribonucleic acid components in the ribosome of *Crithidia fasciculata*, a trypanosomatid protozoan. *Mol. Cell Biol.* **1**, 347-357.
[PMID: 6965102](#) [PDF](#)
24. *SCHNARE, M.N. AND **GRAY, M.W.** (1981) 3'-Terminal nucleotide sequence of *Crithidia fasciculata* small ribosomal subunit RNA. *FEBS Lett.* **128**, 298-304.
[PMID: 7262322](#)
25. *SPENCER, D.F., *BONEN, L. AND **GRAY, M.W.** (1981) Organization and expression of the mitochondrial genome of plants. III. Primary sequence of wheat mitochondrial 5S ribosomal ribonucleic acid: functional and evolutionary implications. *Biochemistry* **20**, 4022-4029.
[PMID: 7284306](#) [PDF*](#)
26. **GRAY, M.W.** AND *SPENCER, D.F. (1981) Is wheat mitochondrial 5S ribosomal RNA prokaryotic in nature? *Nucleic Acids Res.* **9**, 3523-3529.
[PMID: 7024917](#) [PDF](#)
27. *SCHNARE, M.N. AND **GRAY, M.W.** (1982) Nucleotide sequence of an exceptionally long 5.8S ribosomal RNA from *Crithidia fasciculata*. *Nucleic Acids Res.* **10**, 2085-2092.
[PMID: 7079176](#) [PDF](#)
28. MACKAY, R.M., *SPENCER, D.F., SCHNARE, M.N., DOOLITTLE, W.F. AND **GRAY, M.W.** (1982) Comparative sequence analysis as an approach to evaluating structure, function, and evolution of 5S and 5.8S ribosomal RNAs. *Can. J. Biochem.* **60**, 480-489. (Minisymposium on *Biochemical Evolution of the Translational Apparatus*, Can. Fed. Biol. Soc. 24th Annual Meeting, McGill University, Montreal, Quebec, June 14-19, 1981; invited)
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29. *SCHNARE, M.N. AND **GRAY, M.W.** (1982) Organization and expression of the mitochondrial genome of plants. IV. 3'-Terminal sequence of wheat mitochondrial 18S ribosomal RNA: further evidence of a eubacterial evolutionary origin. *Nucleic Acids Res.* **10**, 3921-3932.
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30. *HUH, T.Y. AND **GRAY, M.W.** (1982) Organization and expression of the mitochondrial genome of plants. V. Conservation of ribosomal RNA gene arrangement in the mitochondrial DNA of angiosperms. *Plant Mol. Biol.* **1**, 245-249.
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31. *SCHNARE, M.N, *SPENCER, D.F. AND **GRAY, M.W.** (1983) Primary structure of four novel small ribosomal RNAs from *Crithidia fasciculata*. *Can. J. Biochem. Cell Biol.* **61**, 38-45.
[PMID: 6850409](#) [PDF*](#)
32. **GRAY, M.W.** AND *SPENCER, D.F. (1983) Wheat mitochondrial DNA encodes a eubacteria-like initiator methionine transfer RNA. *FEBS Lett.* **161**, 323-327.
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33. *SPENCER, D.F., *SCHNARE, M.N. AND **GRAY, M.W.** (1984) Pronounced structural similarities between the small subunit ribosomal RNA genes of wheat mitochondria and *Escherichia coli*. *Proc. Natl. Acad. Sci. U.S.A.* **81**, 493-497.
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34. *FALCONET, D., LEJEUNE, B., QUETIER, F. AND **GRAY, M.W.** (1984) Evidence for homologous recombination between repeated sequences containing 18S and 5S ribosomal RNA genes in wheat mitochondrial DNA. *EMBO J.* **3**, 297-302.
[PMID: 16453499](#) [PDF](#)
35. **GRAY, M.W.**, SANKOFF, D. AND CEDERGREN, R.J. (1984) On the evolutionary descent of organisms and organelles: a global phylogeny based on a highly conserved structural core in small subunit ribosomal RNA. *Nucleic Acids Res.* **12**, 5837-5852.
[PMID: 6462918](#) [PDF](#)
36. *BONEN, L., *BOER, P.H. AND **GRAY, M.W.** (1984) The wheat cytochrome oxidase subunit II gene has an intron insert and three radical amino acid changes relative to maize. *EMBO J.* **3**, 2531-2536.
[PMID: 16453565](#) [PDF](#)
37. *BOER, P.H., *BONEN, L., LEE, R.W. AND **GRAY, M.W.** (1985) Genes for respiratory chain proteins and ribosomal RNAs are present on a 16 kbp DNA species from *Chlamydomonas reinhardtii* mitochondria. *Proc. Natl. Acad. Sci. U.S.A.* **82**, 3340-3344. [PMID: 2987921](#) [PDF](#)
38. *SCHNARE, M.N., *HEINONEN, T.Y.K., YOUNG, P.G. AND **GRAY, M.W.** (1985) Phenylalanine and tyrosine transfer RNAs encoded by *Tetrahymena pyriformis* mitochondrial DNA: primary sequence, post-transcriptional modifications, and gene localization. *Curr. Genet.* **9**, 389-393.
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39. *BOER, P.H., *MCINTOSH, J.E., **GRAY, M.W.** AND *BONEN, L. (1985) The wheat mitochondrial gene for apocytochrome b: absence of a prokaryotic ribosome binding site. *Nucleic Acids Res.* **13**, 2281-2292.
[PMID: 2987849](#) [PDF](#)
40. *SCHNARE, M.N., *COLLINGS, J.C. AND **GRAY, M.W.** (1986) Structure and evolution of the small subunit ribosomal RNA gene of *Crithidia fasciculata*. *Curr. Genet.* **10**, 405-410.
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41. *BOER, P.H. AND **GRAY, M.W.** (1986) The URF 5 gene of *Chlamydomonas reinhardtii* mitochondria: DNA sequence and mode of transcription. **EMBO J.** **5**, 21-28.
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42. *SCHNARE, M.N., *HEINONEN, T.Y.K., YOUNG, P.G. AND **GRAY, M.W.** (1986) A discontinuous small subunit ribosomal RNA in *Tetrahymena pyriformis* mitochondria. **J. Biol. Chem.** **261**, 5187-5193.
[PMID: 3082879](#) [PDF](#)
43. *HEINONEN, T.Y.K., *SCHNARE, M.N., YOUNG, P.G. AND **GRAY, M.W.** (1987) Rearranged coding segments, separated by a transfer RNA gene, specify the two parts of a discontinuous large subunit ribosomal RNA in *Tetrahymena pyriformis* mitochondria. **J. Biol. Chem.** **262**, 2879-2887.
[PMID: 3102478](#) [PDF](#)
44. *SPENCER, D.F., *COLLINGS, J.C., *SCHNARE, M.N. AND **GRAY, M.W.** (1987) Multiple spacer sequences in the nuclear large subunit ribosomal RNA gene of *Crithidia fasciculata*. **EMBO J.** **6** 1063-1071.
[PMID: 16453755](#) [PDF](#)
45. LANG, B.F., CEDERGREN, R. AND **GRAY, M.W.** (1987) The mitochondrial genome of the fission yeast, *Schizosaccharomyces pombe*. Sequence of the large subunit ribosomal RNA gene, comparison of potential secondary structure in fungal mitochondrial LSU rRNAs, and evolutionary implications. **Eur. J. Biochem.** **169**, 527-537.
[PMID: 2446871](#) [PDF](#)
46. *JOYCE, P.B.M., *SPENCER, D.F., BONEN, L. AND **GRAY, M.W.** (1988) Genes for tRNA^{Asp}, tRNA^{Pro}, tRNA^{Tyr} and two tRNAs^{Ser} in wheat mitochondrial DNA. **Plant Mol. Biol.** **10**, 251-262.
[PMID: 24277519](#) [PDF](#)
47. CEDERGREN, R., **GRAY, M.W.**, ABEL, Y. AND SANKOFF, D. (1988) The evolutionary relationships among known life forms. **J. Mol. Evol.** **28**, 98-112.
[PMID: 3148747](#)
48. *BOER, P.H. AND **GRAY, M.W.** (1988) Genes encoding a subunit of respiratory NADH dehydrogenase (ND1) and a reverse transcriptase-like protein (RTL) are linked to ribosomal RNA gene pieces in *Chlamydomonas reinhardtii* mitochondrial DNA. **EMBO J.** **7**, 3501-3508.
[PMID: 2463163](#) [PDF](#)
49. *BOER, P.H. AND **GRAY, M.W.** (1988) Scrambled ribosomal RNA gene pieces in *Chlamydomonas reinhardtii* mitochondrial DNA. **Cell** **55**, 399-411.
[PMID: 2846180](#)
[News and Views: DOVER, G.A. (1988) rDNA world falling to pieces. **Nature** **336**, 623-624.]
[PMID: 3200314](#) [PDF](#)
50. *JOYCE, P.B.M., *SPENCER, D.F. AND **GRAY, M.W.** (1988) Multiple sequence rearrangements accompanying the duplication of a tRNA^{Pro} gene in wheat mitochondrial DNA. **Plant Mol. Biol.** **11**, 833-843.
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[PMID: 3242866](#) [PDF](#)
52. **GRAY, M.W.**, CEDERGREN, R., ABEL, Y. AND SANKOFF, D. (1989) On the evolutionary origin of the plant mitochondrion and its genome. **Proc. Natl. Acad. Sci. U.S.A.** **86**, 2267-2271.
[PMID: 16594021](#) [PDF](#)
53. *JOYCE, P.B.M. AND **GRAY, M.W.** (1989) Chloroplast-like transfer RNA genes expressed in wheat mitochondria. **Nucleic Acids Res.** **17**, 5461-5476.
[PMID: 2762145](#) [PDF](#)
54. *JOYCE, P.B.M. AND **GRAY, M.W.** (1989) Aspartate and asparagine tRNA genes in wheat mitochondrial DNA: a cautionary note on the isolation of tRNA genes from plants. **Nucleic Acids Res.** **17**, 7865-7878.
[PMID: 2798132](#) [PDF](#)
55. *COVELLO, P.S. AND **GRAY, M.W.** (1989) RNA editing in plant mitochondria. **Nature** **341**, 662-666.
[PMID: 2552326](#) [PDF*](#)
56. *COULTHART, M.B., *HUH, G.S. AND **GRAY, M.W.** (1990) Physical organization of the 18S and 5S ribosomal RNA genes in the mitochondrial genome of rye (*Secale cereale* L.). **Curr. Genet.** **17**, 339-346.
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[PMID: 1696257](#) [PDF](#)
58. *SCHNARE, M.N. AND **GRAY, M.W.** (1990) Sixteen discrete RNA components in the cytoplasmic ribosome of *Euglena gracilis*. **J. Mol. Biol.** **215**, 73-83.
[PMID: 2118960](#)
59. *SCHNARE, M.N., COOK, J.R. AND **GRAY, M.W.** (1990) Fourteen internal transcribed spacers in the circular ribosomal DNA of *Euglena gracilis*. **J. Mol. Biol.** **215**, 85-91.
[PMID: 2118961](#)
60. *COVELLO, P.S. AND **GRAY, M.W.** (1990) RNA sequence and the nature of the Cu_A-binding site in cytochrome c oxidase. **FEBS Lett.** **268**, 5-7.
[PMID: 1696552](#)
61. *COVELLO, P.S. AND **GRAY, M.W.** (1990) Differences in editing at homologous sites in messenger RNAs from angiosperm mitochondria. **Nucleic Acids Res.** **18**, 5189-5196.
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62. *HANIC-JOYCE, P.J., *SPENCER, D.F. AND **GRAY, M.W.** (1990) *In vitro* processing of transcripts containing novel tRNA-like sequences ('t-elements') encoded by wheat mitochondrial DNA. **Plant Mol. Biol.** **15**, 551-559.
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63. *HEINONEN, T.Y.K., *SCHNARE, M.N. AND **GRAY, M.W.** (1990) Sequence heterogeneity in the duplicate large subunit ribosomal RNA genes present in *Tetrahymena pyriformis* mitochondrial DNA. **J. Biol. Chem.** **265**, 22336-22341.
[PMID: 2125048](#) [PDF](#)
64. TURMEL, M., BOULANGER, J., *SCHNARE, M.N., **GRAY, M.W.** AND LEMIEUX, C. (1991) Six group I introns and three internal transcribed spacers in the chloroplast large subunit ribosomal RNA gene of the green alga *Chlamydomonas eugametos*. **J. Mol. Biol.** **218**, 293-311.
[PMID: 1849178](#)
65. *BOER, P.H. AND **GRAY, M.W.** (1991) Short dispersed repeats localized in spacer regions of mitochondrial DNA from *Chlamydomonas reinhardtii*. **Curr. Genet.** **19**, 309-312.
[PMID: 1831072](#)
66. DOUGLAS, S.E., MURPHY, C.A., *SPENCER, D.F. AND **GRAY, M.W.** (1991) Cryptomonad algae are evolutionary chimaeras of two phylogenetically distinct unicellular eukaryotes. **Nature** **350**, 148-151.
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33. **GRAY, M.W.** (2012) Mitochondrial genome. In **Brenner's Online Encyclopedia of Genetics 2E**, S. Maloy and K. Hughes (eds.), Elsevier, in press
34. **GRAY, M.W.** (2012) Mitochondrial mutants. In **Brenner's Online Encyclopedia of Genetics 2E**, S. Maloy and K. Hughes (eds.), Elsevier, in press
35. **Gray, M.** (2013) Mitochondrial genomes. In: Bell, E., Bond, J., Klinman, J., Masters, B. and Wells, R. (eds.) **Molecular Life Sciences: An Encyclopedic Reference**: SpringerReference (www.springerreference.com). Springer-Verlag Berlin Heidelberg, 2013. DOI: 10.1007/SpringerReference_333640 2014-03-20 13:49:09 UTC. Overview Essay for Subsection 6a (Mitochondrial Genomes), Section 4 (Genes & Genomes: Structure)
36. **GRAY, M.W.** (June 2013) RNA editing: evolutionary implications. In **eLS 2013**, John Wiley & Sons, Ltd., Chichester. DOI: 10.1002/9780470015902.a0003069.pub3
<http://www.els.net/>
37. *GAWRYLUK, R.M.R., CHISHOLM, K.A., PINTO, D.M. AND **GRAY, M.W.** (2014) Data showing the compositional complexity of the mitochondrial proteome of a unicellular eukaryote (*Acanthamoeba castellanii*, supergroup Amoebozoa). **Data in Brief** **1**, 12-14.
[PDF](#)

38. **GRAY, M.W.** AND MOOTHA, V.K. (2018) Evolutionary mitochondrial biology in Titisee. (2018) *IUBMB Life* **70**, 1184-1187.
Preface, Special Issue, *Evolutionary Mitochondrial Biology*
[PMID:30358089](#) [PDF](#)

In Preparation

GRAY, M.W. (2019) Origin and evolution of mitochondria. **eLS**

IV. Invited Book Chapters

1. *CUNNINGHAM, R.S., **GRAY, M.W.**, DOOLITTLE, W.F. AND BONEN, L. (1977) The prokaryotic nature of wheat embryo mitochondrial 18S ribosomal RNA. In **Acides Nucléiques et Synthèse des Protéines Chez les Végétaux** (Bogorad, L. and Weil, J.H., eds.), pp. 243-248, Centre National de la Recherche Scientifique, Paris.
2. **GRAY, M.W.**, *BONEN, L., *FALCONET, D., *HUH, T.Y., *SCHNARE, M.N. AND *SPENCER, D.F. (1982) The mitochondrial ribosomal RNAs of *Triticum aestivum* (wheat): sequence analysis and gene organization. In **Mitochondrial Genes** (Slonimski, P., Borst, P. and Attardi, G., eds.), pp. 483-488, Cold Spring Harbor Laboratory Press, Cold Spring Harbor, New York.
[PDF](#)
3. **GRAY, M.W.**, *HUH, T.Y., *SCHNARE, M.N., * SPENCER, D.F. AND *FALCONET, D. (1983) Organization and evolution of ribosomal RNA genes in wheat mitochondria. In **Structure and Function of Plant Genomes** (Ciferri, O. and Dure, L., eds.), pp. 373-380, Plenum Press, New York.
4. *SPENCER, D.F., WILLIAMSON, S., *SCHNARE, M.N., **GRAY, M.W.**, DOOLITTLE, W.F. AND *BONEN, L. (1983) The endosymbiotic origin of organelles: compelling support from ribosomal RNA sequence data. In **Endocytobiology II. Intracellular Space as Oligogenetic System** (Schenk, H.E.A. and Schwemmler, W., eds.), pp. 871-879, Walter de Gruyter, Berlin.
5. **GRAY, M.W.**, *HUH, T.Y., *SCHNARE, M.N., *SPENCER, D.F. AND *FALCONET, D. (1985) Organization and evolution of ribosomal RNA genes in wheat mitochondria. In **The Origin of Eukaryotic Cells** (Dyer, B.D. and Ober, R., eds.), pp. 145-152, Van Nostrand Reinhold, Florence, Kentucky.
(Selected for reprinting from **Structure and Function of Plant Genomes** (1983)) (Ciferri O, and Dure, L., eds.), pp. 373-380, Plenum Press, New York)
6. **GRAY, M.W.** AND CLAYTON, D.A. (1987) Characterization of a mouse mitochondrial transcription system. In **Transcriptional Control Mechanisms** (Granner, D.K., Rosenfeld, G. and Chang, S., eds.), UCLA Symposium on Molecular and Cellular Biology, New Series, V. 52, pp. 395-404, Alan R. Liss, Inc., New York.
7. SANKOFF, D., ABEL, Y., CEDERGREN, R.J. AND **GRAY, M.W.** (1988) Supercomputing for molecular cladistics. In **Classification and Related Methods of Data Analysis** (Bock, H.H., ed.), pp. 385-394, North-Holland, Amsterdam.
(Proceedings of the First Conference of the International Federation of Classification Societies (IFCS'87), Aachen, F.R.G., June 29-July 7, 1987)
8. **GRAY, M.W.**, *BOER, P.H., *COLLINGS, J.C., *HEINONEN, T.Y.K., *SPENCER, D.F. AND *SCHNARE, M.N. (1989) Ribosomal RNA genes in pieces. In **Highlights of Modern Biochemistry** (Kotyck, A., Škoda, J., Pačes, V. and Kostka, V., eds.), pp. 521-530, VSP. International Science Publishers, Zeist. (Proceedings of the 14th International Congress of Biochemistry, Prague, Czechoslovakia, July 10-15, 1988)

9. **GRAY, M.W.** (1990) The mitochondrial genome and its expression. Chapter 10, in ***Plant Physiology, Biochemistry and Molecular Biology*** (Dennis, D.T. and Turpin, D.H., eds.), pp. 147-159, Longman Group, Harlow, U.K.
10. **GRAY, M.W.** AND *SCHNARE, M.N. (1990) Evolution of the modular structure of ribosomal RNA. Chapter 52, in ***The Ribosome: Structure, Function, and Evolution*** (Hill, W.E., Dahlberg, A., Garrett, R., Moore, P.B., Schlessinger, D. and Warner, J.R., eds.), pp. 589-597, American Society for Microbiology, Washington, DC.
11. **GRAY, M.W.** (1991) Origin and evolution of plastid genomes and genes. Chapter 11, in ***The Molecular Biology of Plastids*** (Vol. 7A in ***Cell Culture and Somatic Cell Genetics of Plants***) (Bogorad, L. and Vasil, I.K., eds.), pp. 303-330, Academic Press, Inc.
12. *SPENCER, D.F., **GRAY, M.W.** AND *SCHNARE, M.N. (1992) The isolation of wheat mitochondrial DNA and RNA. In ***Seed Analysis*** (Vol. 14 in ***Modern Methods of Plant Analysis, New Series***) (Linskens, H.F. and Jackson, J.F., eds.), pp. 347-360, Springer-Verlag, Berlin/Heidelberg.
13. **GRAY, M.W.** (1992) Split RNAs and modified nucleosides in ribosome evolution. In ***The Origin and Evolution of the Cell*** (Hartman, H. and Matsuno, K., eds.), pp. 333-358, World Scientific, Singapore.
(Proceedings of the Conference on the *Origin and Evolution of Prokaryotic and Eukaryotic Cells*, Shimoda, Japan, Apr. 22-25, 1992)
14. **GRAY, M.W.** AND *LONERGAN, K.M. (1993) Transfer RNA editing in *Acanthamoeba castellanii* mitochondria. Chapter 1, in ***Plant Mitochondria*** (Brennicke, A. and Kück, U., eds.), pp. 15-22, VCH Verlagsgesellschaft mbH/VCH Publishers, Weinheim/Cambridge/New York.
15. **GRAY, M.W.** (1995) Mitochondrial evolution. Chapter 20, in ***The Molecular Biology of Plant Mitochondria*** (Vol. 2 in ***Advances in Cellular and Molecular Biology of Plants***) (Levings, C.S. III and Vasil, I.K., eds.), pp. 635-659, Kluwer Academic Publishers, Dordrecht, The Netherlands.
16. **GRAY, M.W.**, *GREENWOOD, S.J., *SMALLMAN, D.S., *SPENCER, D.F. AND *SCHNARE, M.N. (1995) Ribosomal RNA in pieces: a modern paradigm of the primordial ribosome. In ***Tracing Biological Evolution in Protein and Gene Structures*** (Go, M. and Schimmel, P., eds.), pp. 65-76, Elsevier Science B.V., Amsterdam, The Netherlands.
[Also published in the Proceedings of the 20th Taniguchi Symposium, Biophysics Division (1994) (Go, M., ed.), pp. 91-106]
17. **GRAY, M.W.** AND *SCHNARE, M.N. (1996) Evolution of rRNA gene organization. Chapter 3, in ***Ribosomal RNA: Structure, Evolution, Processing, and Function in Protein Biosynthesis*** (R.A. Zimmermann and A.E. Dahlberg, eds.), pp. 49-69, CRC Press, Boca Raton, Florida.

18. **GRAY, M.W.** AND *SPENCER, D.F. (1996) Organellar evolution. In ***Evolution of Microbial Life*** (Society for General Microbiology Symposium 54) (Roberts, D.M., Sharp, P., Alderson, G. and Collins, M., eds.), pp. 109-126, Cambridge University Press, U.K. (Main Symposium, *Evolution of Microbial Life*, 134th Meeting of the Society for General Microbiology, University of Warwick, U.K., Mar. 26-29, 1996)
19. BONEN, L. AND **GRAY, M.W.** (1997) The mitochondrial genome and its expression. In ***Plant Metabolism (Section III: Mitochondrial Metabolism)*** (Dennis, D.T., Turpin, D.H., Lefebvre, D. D. and Layzell, D. B., eds.), pp. 166-180, Addison Wesley Longman, Harlow, U.K.
20. *PRICE, D.H. AND **GRAY, M.W.** (1998) Editing of transfer RNA. In ***Modification and Editing of RNA: The Alteration of RNA Structure and Function*** (Grosjean, H. and Benne, R., eds.), pp. 289-305, ASM Press, Washington, D.C.
[eBook](#)
21. **GRAY, M.W.**, LEMIEUX, C., BURGER, G., LANG, B.F., OTIS, C., PLANTE, I. AND TURMEL, M. (1998) Mitochondrial genome organization and evolution within the green algae and land plants. In ***Plant Mitochondria: From Gene to Function*** (Møller, I.M., Gardeström, P., Glimelius, K. and Glaser, E., eds.), pp. 1-8, Backhuys Publishers, Leiden, The Netherlands.
22. *IKEDA, T.M. AND **GRAY, M.W.** (1998) Biochemical characterization of the wheat mitochondrial transcriptional machinery. In ***Plant Mitochondria: From Gene to Function*** (Møller, I.M., Gardeström, P., Glimelius, K. and Glaser, E., eds.), pp. 191-194, Backhuys Publishers, Leiden, The Netherlands.
23. **GRAY, M.W.** (2001) Speculations on the origin and evolution of editing. In ***RNA Editing***, Frontiers in Molecular Biology (Bass, B.L., ed.), pp. 160-184, Oxford University Press, Oxford, U.K.
[URL](#)
24. **GRAY, M.W.** (2004) The evolutionary origins of plant organelles. In ***Molecular Biology and Biotechnology of Plant Organelles*** (Daniell, H. and Chase, C., eds.), pp. 15-36, Springer, Dordrecht, The Netherlands.
[URL](#)
25. **GRAY, M.W.** (2005) Contemporary issues in mitochondrial origins and evolution. In ***Microbial Phylogeny and Evolution. Concepts and Controversies***. (Sapp, J., ed.), Oxford University Press, New York, pp. 224-237.
[URL](#)
26. LIN, S., ZHANG, H. AND **GRAY, M.W.** (2008) RNA editing in dinoflagellates and its implications for the evolutionary history of the editing machinery. In ***RNA and DNA Editing: Molecular Mechanisms and Their Integration into Biological Systems*** (Smith, H.C., ed.), Wiley Press, pp. 280-309.
[PDF](#)
27. **GRAY, M.W.** AND ARCHIBALD, J.M. (2012) Origins of mitochondria and plastids. In ***Genomics of Chloroplasts and Mitochondria*** (Bock, R. and Knoop, V., eds.), Springer, Dordrecht, pp. 1-30.

28. DODBELE, S., JACKMAN, J.E., AND **GRAY, M.W.** (2018) Mechanisms and evolution of mitochondrial tRNA 5'-editing. In ***RNA Metabolism in Mitochondria*** (Cruz-Reyes, J. and Gray, M.W., eds.), Vol. 34, *Nucleic Acids and Molecular Biology*, Springer International Publishing AG, pp. 177-198.

V. Books Edited

CRUZ-REYES, J. AND **GRAY, M.W.** (eds.) (2018) ***RNA Metabolism in Mitochondria***, Vol. 34, *Nucleic Acids and Molecular Biology*, Springer International Publishing AG, part of Springer Nature https://doi.org/10.1007/978-3-319-78190-7_1

VI. Invited Conference Presentations

(Presenter's name underlined)

1. MACKAY, R.M., SCHNARE, M.N., SPENCER, D.F., GRAY, M.W. AND DOOLITTLE, W.F. (1981) ***Proc. Can. Fed. Biol. Soc.* 24**, 318.
Evolutionary and structural implications of new 5S and 5.8S ribosomal RNA sequences from plants and protists.
(Minisymposium on ***Biochemical Evolution of the Translational Apparatus***, 24th Annual Meeting of the Canadian Federation of Biological Societies, McGill University, Montreal, QC, June 14-19)
2. GRAY, M.W. (1981) ***The Evolution of the Eukaryotic Genome and Its Components***, Dalhousie University, Halifax, NS, July 12-15.
The mitochondrial lineage: an overview.
3. GRAY, M.W. (1982) N.A.T.O. Advanced Studies Institute, F.E.B.S. Advanced Course on ***Structure and Function of Plant Genomes***, Porto Portese, Italy, Aug. 23-Sept. 2.
Physical structure and gene organization in higher plant mitochondrial DNA: organization of the ribosomal RNA genes in the mitochondrial genome of wheat.
4. BOER, P.H., BONEN, L., LEE, R.W. AND GRAY, M.W. (1984) **EMBO Workshop on Plant Mitochondrial DNA: Organization, Information Content, Expression**, Melrose, Scotland, May 21-25.
Characterization of the 16K DNA from Chlamydomonas reinhardtii mitochondria.
5. SPENCER, D.F., SCHNARE, M.N. AND GRAY, M.W. (1984) **EMBO Workshop on Plant Mitochondrial DNA: Organization, Information Content, Expression**, Melrose, Scotland, May 21-25.
Ribosomal RNA genes in wheat mitochondrial DNA.
6. GRAY, M.W., BOER, P., BONEN, L., SCHNARE, M.N. AND SPENCER, D.F. (1985) ***Fed. Proc.* 44**, 1051.
Organization and evolution of plant mitochondrial DNA.
(Minisymposium on ***Mitochondrial DNA***, 69th Annual Meeting of Federation of American Societies for Experimental Biology, Anaheim, CA, Apr. 21-26)
7. BOER, P.H. AND GRAY, M.W. (1985) **Second International Conference on Genetics and Molecular Biology of Chlamydomonas**, University of California, Santa Cruz, CA, Aug. 11-15.
Expression of the mitochondrial genome of Chlamydomonas reinhardtii.
8. GRAY, M.W. (1985) **Gordon Research Conference on Origin of Life**, Proctor Academy, Andover, NH, Aug. 19-23.
A polyphyletic origin of mitochondria?
9. BOER, P.H. AND GRAY, M.W. (1985) **First International Congress of Plant Molecular Biology**, Savannah, GA, Oct. 28-Nov. 2.
Organization and expression of the mitochondrial genome of Chlamydomonas reinhardtii.

10. **GRAY, M.W.** (1986) **Annual Meeting of the Genetics Society of Canada**, Université Laval, Québec, QC, June 8-11.
Evolution of organelle ribosomal RNA genes.
(Symposium on **Genetics of Organelles**)
11. **LEMIEUX, C.**, BOULANGER, J., **GRAY, M.W.**, LEE, R.W., LEMIEUX, B. AND TURMEL, M. (1986) **Annual Meeting of the Genetics Society of Canada**, Université Laval, Québec, QC, June 8-11.
Chloroplast DNA recombination in interspecific hybrids of Chlamydomonas.
(Symposium on **Genetics of Organelles**)
12. **GRAY, M.W.** (1987) **UCLA-CIAR Western Winter Workshop on The Evolution of Genes and Genomes**, Lake Tahoe, CA, Mar. 4-7.
Ribosomal RNA and organelle origins.
13. BOER, P.H. AND **GRAY, M.W.** (1987) **Royal Society Discussion Meeting on Mitochondrial Biogenesis**, London, England, May 28-29.
Organization and expression of algal mitochondrial DNA.
14. **GRAY, M.W.** (1987) **30th Annual Meeting of the Canadian Federation of Biological Societies**, Winnipeg, MB, June 22-26.
Organelle origins and ribosomal RNA.
(Boehringer Mannheim Award Lecture)
15. **GRAY, M.W.** (1987) **Meeting on Molecular Biology of Mitochondria and Chloroplasts**, Cold Spring Harbor Laboratory, Cold Spring Harbor, NY, Aug. 25-30.
Ribosomal RNA genes and evolution of mitochondria.
16. **GRAY, M.W.** (1987) **1st Annual Meeting, Program in Evolutionary Biology, Canadian Institute for Advanced Research**, White Point Beach, NS, Sept. 10-13.
Origins of mitochondria.
17. **GRAY, M.W.** (1988) **The Fifth Annual Biology Grad Symposium on Evolution**, Carleton University, Ottawa, ON, Feb. 26.
The bacterial ancestry of plastids and mitochondria.
18. **GRAY, M.W.**, BOER, P.H., COLLINGS, J.C., HEINONEN, T.Y.K., SPENCER, D.F. AND SCHNARE, M.N. (1988) **14th International Congress of Biochemistry**, Prague, Czechoslovakia, July 10-15.
Ribosomal RNA genes in pieces.
19. **GRAY, M.W.**, CEDERGREN, R., ABEL, Y. AND SANKOFF, D. (1988) **4th International Congress of Cell Biology**, Montreal, QC, Aug. 14-19.
The origin of mitochondria.
20. **GRAY, M.W.**, BOER, P.H., BOULANGER, J., HEINONEN, T.Y.K., LEMIEUX, C., SCHNARE, M.N. AND TURMEL, M. (1988) **Meeting on Ribosome Synthesis**, Cold Spring Harbor, NY, Sept. 21-25.
Discontinuous ribosomal RNAs in mitochondria and chloroplasts.

21. **GRAY, M.W.** (1988) **14th Annual EMBO Symposium on *Organelle Genomes and the Nucleus***, Heidelberg, Germany, Sept. 26-29.
Mitochondrial genome diversity, ribosomal RNA sequences, and evolution of mitochondrial DNA.
22. **GRAY, M.W.** (1988) **2nd Annual Meeting, Program in Evolutionary Biology, Canadian Institute for Advanced Research**, Ste. Marguerite Stn., QC, Oct. 13-16.
Progress towards a phylogeny of mitochondria.
23. JOYCE, P.B.M. AND **GRAY, M.W.** (1989) **13th International tRNA Workshop**, University of British Columbia, Vancouver, BC, June 4-9.
Native and chloroplast DNA-derived transfer RNA genes in wheat mitochondrial DNA.
24. **GRAY, M.W.** (1989) **Canadian Society of Plant Physiologists/ American Society of Plant Physiologists Joint Meeting**, Toronto, ON, July 30-Aug. 3.
Origin and evolution of the mitochondrial genome.
(The President's Symposium on ***Evolution, Function and Structure of Organellar- and Nuclear-Coded Proteins***).
25. **GRAY, M.W.** AND SCHNARE, M.N. (1989) **American Society of Microbiology Conference on Ribosomes**, East Glacier, MT, Aug. 6-11.
Evolution of the modular structure of ribosomal RNA.
26. **GRAY, M.W.** (1989) **Workshop on Molecular Evolution**, Marine Biological Laboratory, Woods Hole, MA, Aug. 20-Sept. 1.
Mitochondrial genome evolution.
27. **GRAY, M.W.** (1989) **3rd Annual Meeting, Program in Evolutionary Biology, Canadian Institute for Advanced Research**, Sidney, BC, Sept. 6-10.
Evolution of ribosomal RNA.
28. **GRAY, M.W.** (1990) **University of Florida Winter Organelle Meeting**, Clearwater, FL, Feb. 22-25.
Toward a phylogeny of mitochondria: progress and pitfalls.
29. **COVELLO, P.S.** AND **GRAY, M.W.** (1990) **Meeting on RNA Processing**, Cold Spring Harbor Laboratory, Cold Spring Harbor, NY, May 16-20.
RNA editing in plant mitochondria: what we can learn from sequence comparisons.
30. **GRAY, M.W.** (1990) **33rd Annual Meeting of the Canadian Federation of Biological Societies**, Dalhousie University, Halifax, NS, June 14-16.
From the many to the one?: evolution of rRNA structural complexity.
(Symposium on ***Ribosomal RNA: Structure, Function and Evolution***)
31. **GRAY, M.W.** (1990) **Gordon Research Conference on Extrachromosomal Elements**, Plymouth State College, Plymouth, NH, June 18-22.
Genes and gene expression in wheat mitochondria.
32. **GRAY, M.W.**, SPENCER D.F. AND LONERGAN, K. (1990) **Genetics Society of America/Genetics Society of Canada Joint Meeting**, San Francisco, CA, July 18-21.
Charting the course of mitochondrial genome evolution.

33. **GRAY, M.W.**, SPENCER D.F. AND LONERGAN, K. (1990) **Fourth International Workshop on Plant Mitochondria**, Cornell University, Ithaca, NY, Sept. 23-27.
The phylogenetic position of the plant mitochondrial genome.
34. **COVELLO, P.S.**, HANIC-JOYCE, P.J. AND **GRAY, M.W.** (1990) **Fourth International Workshop on Plant Mitochondria**, Cornell University, Ithaca, NY, Sept. 23-27.
Making messages: transcription initiation and RNA editing in plant mitochondria.
35. AUCHINCLOSS, A.H., MENASSA, R., SINGH, M., COVELLO, P.S., **GRAY, M.W.** AND **BROWN, G.G.** (1990) **Fourth International Workshop on Plant Mitochondria**, Cornell University, Ithaca, NY, Sept. 23-27.
Transcription initiation sites of the soybean mitochondrial genome.
36. **GRAY, M.W.** (1990) **Indiana Molecular Biology Symposium V on Evolution of Genetic and Developmental Systems**, Indiana University, Bloomington, IN, Oct. 28-31.
Origin and evolution of mitochondrial DNA.
37. **GRAY, M.W.** AND COVELLO, P.S. (1991) **34th Annual Meeting of the Canadian Federation of Biological Societies**, Queen's University, Kingston, ON, June 9-11.
RNA editing in plant mitochondria.
(Symposium on **RNA Processing and Regulation of mRNA Expression**)
38. **GRAY, M.W.** (1991) **5th Annual Meeting, Program in Evolutionary Biology, Canadian Institute for Advanced Research**, Québec, QC, Aug. 10-14.
How many origins for organelles?
39. **GRAY, M.W.** AND COVELLO, P.S. (1991) **Third International Congress of Plant Molecular Biology (Molecular Biology of Plant Growth and Development)**, Tucson, AZ, Oct. 6-11.
RNA editing and gene migration in plant mitochondria.
(Symposium on **Mitochondria: Mitochondrial Gene Organization**)
40. **GRAY, M.W.**, SPENCER, D.F., MURPHY, C.A. AND DOUGLAS, S.E. (1992) **Abstracts of the 158th National Meeting of the American Association for the Advancement of Science**, Chicago, IL, Feb. 6-11, pg. 57.
Cryptomonads show evidence of endosymbiosis by a eukaryotic alga.
(Symposium on **Genetic Information**)
41. **GRAY, M.W.** (1992) **The Origin and Evolution of Prokaryotic and Eukaryotic Cells**, Shimoda, Japan, Apr. 22-25.
Fragmented ribosomal RNAs: functional and evolutionary significance.
42. **GRAY, M.W.** AND LONERGAN, K.M. (1992) **HFSP Workshop on RNA Editing in Plant Mitochondria and Chloroplasts - Comparison with RNA Editing Processes in Trypanosomes, Physarum and Mammalia**, Berlin, Germany, Sept. 15-20.
Transfer RNA editing in Acanthamoeba castellanii mitochondria.
43. **Covello, P.S.** and **Gray, M.W.** (1992) **HFSP-Workshop on RNA Editing in Plant Mitochondria and Chloroplasts - Comparison with RNA Editing Processes in Trypanosomes, Physarum and Mammalia**, Berlin, Germany, Sept. 15-20.
A model for the evolution of RNA editing.

44. **GRAY, M.W.** AND LONERGAN, K.M. (1993) **15th International tRNA Workshop**, Cap d'Agde, France, May 30 - June 4.
Editing of transfer RNAs.
45. **LANG, B.F.**, **GRAY, M.W.** AND **BURGER, G.** (1993) **Annual Meeting of the Genetics Society of Canada**, Manoir du Lac Delage, QC, June 11-14.
Molecular evolution of mitochondrial genomes.
46. **GRAY, M.W.** (1993) **Annual Meeting of the Canadian Society of Plant Molecular Biology**, University of Toronto, Toronto, ON, Aug. 14-17.
The evolutionary origin of mitochondria: mitochondrial genome organization and diversity in plants, algae and non-photosynthetic protists.
47. **GRAY, M.W.**, **BURGER, G.** AND **LANG, B.F.** (1993) **XV International Botanical Congress**, Pacifico Yokohama, Yokohama, Japan, Aug. 28 - Sept. 3.
Mitochondrial genome organization and diversity in plants and algae: evolutionary considerations.
(Symposium on **Organization of Organellar Genome**)
48. **GRAY, M.W.** (1993) **7th Annual Meeting, Program in Evolutionary Biology, Canadian Institute for Advanced Research**, Banff, AB, Oct. 20-23.
On the evolution of RNA editing.
49. **GRAY, M.W.** (1994) **One Day Special Meeting, Linnean Society of London, Modern Views on Kingdoms and Domains. Is Hogg's Protoctista a Suitable Classification for the Late 20th Century?** Burlington House, Piccadilly, London, U.K., Apr. 14.
Mitochondrial phylogeny & evolution.
50. **GRAY, M.W.** (1994) **Gordon Research Conference on Mitochondria and Chloroplasts**, Volterra, Italy, May 1-6.
Transfer RNA editing in mitochondria: characteristics and evolution.
51. LONERGAN, K.M., PRICE, D.H. AND **GRAY, M.W.** (1994) **EMBO-CNRS Workshop on Nucleotide Modification and Base Conversion of RNA**, Aussois, France, May 4-8.
Mitochondrial transfer RNA editing in the amoeboid protozoan, Acanthamoeba castellanii.
(Session 4, **RNA Editing - Part B**)
52. O'KELLY, C.J., PAQUIN, B., ROEWER, I., FORGET, L., BURGER, G., **GRAY, M.W.** AND **LANG, B.F.** (1994) **37th Annual Meeting of the Canadian Federation of Biological Societies**, Palais des Congrès, Montréal, QC, June 16-18.
Evolution of mitochondrial genomes in fungi and lower protists.
53. **GRAY, M.W.**, **BURGER G.** AND **LANG, B.F.** (1994) **4th International Congress of Plant Molecular Biology**, Amsterdam, Netherlands, June 19-24.
Mitochondrial genomes in unicellular algae and other protists.
(Symposium on **Organelle Genomes**)

54. BURGER, G., O'KELLY, C.J., **GRAY, M.W.**, CEDERGREN, R.C., TURMEL, M., LEMIEUX, C., SANKOFF, D., GOLDING, B. AND LANG, B.F. (1994) **10th Biennial Meeting of the International Society for Evolutionary Protistology (ISEP-10)**, Dalhousie University, Halifax, NS, Aug. 4-10.
The diversification of mitochondria in protists: megasequencing of microgenomes.
(Session on **Small Genomes**)
55. **GRAY, M.W.**, GREENWOOD, S.J., SMALLMAN, D.S., SPENCER, D.F. AND SCHNARE, M.N. (1994) **Overlap Day, 10th Biennial Meeting of the International Society for Evolutionary Protistology (ISEP-10) and 8th Annual Meeting, Program in Evolutionary Biology, Canadian Institute for Advanced Research**, Dalhousie University, Halifax, NS, Aug. 10.
Split ribosomal RNAs and ribosome evolution.
(Associated Symposium on **Evolution of Unusual Molecular Processes in Protists**)
56. LANG, B.F., O'KELLY, C., BURGER, G. AND **GRAY, M.W.** (1994) **8th Annual Meeting, Program in Evolutionary Biology, Canadian Institute for Advanced Research**, Dalhousie University, Halifax, NS, Aug. 10-14.
The megasequencing of microgenomes.
(Presentation by members of the Organelle Genome Megasequencing Program (OGMP))
57. **GRAY, M.W.**, LONERGAN, K.M., PRICE, D.M., LAFOREST, M.-J. AND LANG, B.F. (1994) **1994 Albany Conference**, Rensselaerville, NY, Oct. 6-9.
Transfer RNA editing in protozoan and fungal mitochondria.
58. **GRAY, M.W.**, GREENWOOD, S.J., SMALLMAN, D.S., SPENCER, D.F. AND SCHNARE, M.N. (1994) **20th Taniguchi Symposium (Biophysics Division) on Tracing Biological Evolution in Protein and Gene Structures**, Nagoya, Japan, Oct. 31-Nov. 5.
Ribosomal RNA in pieces: a modern paradigm of the primordial ribosome?
59. **GRAY, M.W.** (1994) **Banbury Center Conference on Evolution of Genes and Genomes**, Cold Spring Harbor Laboratory, Cold Spring Harbor, NY, Nov. 9-12.
The organelle genome megasequencing project: exploring mitochondrial DNA evolution.
60. BURGER, G., **GRAY, M.W.**, REITH, M. AND LANG, B.F. (1995) **Plant Mitochondria: from Gene to Function**, Duke University, Durham, NC, Apr. 7-12.
Complete sequence of the mitochondrial genome of the rhodophyte, Porphyra purpurea: a mitochondrial perspective on the evolution of red and green algae.
61. SPENCER, D.F. AND **GRAY, M.W.** (1995) **Frontiers in Translation, An International Conference on the Structure and Function of the Ribosome**, Victoria, BC, May 20-25.
Mitochondrial ribosomal RNA genes in the early diverging protist, Euglena gracilis: fragmented genes in a fragmented genome.
62. BURGER, G., LANG, B.F., REITH, M. AND **GRAY, M.W.** (1995) **9th Annual Meeting, Program in Evolutionary Biology, Canadian Institute for Advanced Research**, Val Morin, QC, Aug. 23-27.
Complete sequence of the mitochondrial genome of the rhodophyte alga, Porphyra purpurea.
(Presentation by members of the Organelle Genome Megasequencing Program (OGMP))

63. **GRAY, M.W.** (1995) **EMBO Workshop on Molecular Evolution of Archaeal, Bacterial and Organelle Genomes**, Aronsborg, Bålsta, Sweden, Oct. 6-9.
Impact of large-scale sequencing on ideas about organellar genome origins and evolution.
64. **BURGER, G., CEDERGREN, R., GOLDING, B., GRAY, M.W., LANG, B.F., LEMIEUX, C., LITTLEJOHN, T.G., SANKOFF, D. AND TURMEL, M.** (1995) **EMBO Workshop on Molecular Evolution of Archaeal, Bacterial and Organelle Genomes**, Aronsborg, Bålsta, Sweden, Oct. 6-9.
Mitochondrial genomes as a unique window on the evolutionary history of the lower eukaryotes.
65. **GRAY, M.W.** (1995) **Earth Systems Evolution Meeting, Canadian Institute for Advanced Research**, Dalhousie University, Halifax, NS, Oct. 12-14.
The origin of organelles of respiration and photosynthesis.
66. **GRAY, M.W.** (1996) **134th Ordinary Meeting, Society for General Microbiology**, University of Warwick, Coventry, U.K., Mar. 25-29.
Co-evolution: organellar evolution.
(Main Symposium, **Evolution of Microbial Life**)
67. **GRAY, M.W., BURGER, G., CEDERGREN, R., GOLDING, B., LEMIEUX, C., LITTLEJOHN, T.G., SANKOFF, D., TURMEL, M. AND LANG, B.F.** (1996) **Genome Canada 96**, Ottawa, ON, June 13-16.
Mitochondrial genomes as a unique window to resolve the phylogeny of the eukaryotes.
68. **BURGER, G., LASKOWSKA, M., RIOUX, P., LITTLEJOHN, T.G., CEDERGREN, R., GOLDING, B., LEMIEUX, C., SANKOFF, D., TURMEL, M., GRAY, M.W. AND LANG, B.F.** (1996) **Genome Canada 96**, Ottawa, ON, June 13-16.
Management and analysis of sequence data from multiple organelle genomes.
69. **GRAY, M.W.** (1996) **Gordon Research Conference on Mitochondria and Chloroplasts**, Plymouth State College, Plymouth, NH, June 16-21.
Transcription in plant and protist mitochondria.
70. **GRAY, M.W.** (1996) **10th Annual Meeting, Program in Evolutionary Biology, Canadian Institute for Advanced Research**, Sidney, BC, Aug. 28-Sept. 1.
*Ribosomal and small nuclear RNAs in *Euglena gracilis*.*
71. **GRAY, M.W.** (1996) **EMBO Workshop on RNA Editing**, Maastricht, The Netherlands, Sept. 5-8.
Origin and evolution of RNA editing systems.
72. **GRAY, M.W., LONERGAN, K.M., PRICE, D.H., EDQVIST, J., LAFOREST, M.-J., ROEWER, I. AND LANG, B.F.** (1996) **EMBO Workshop on RNA Editing**, Maastricht, The Netherlands, Sept. 5-8.
Editing of transfer RNA in protozoan and fungal mitochondria.
73. **LANG, B.F., BURGER, G. AND GRAY, M.W.** (1997) **General Meeting of the American Society for Microbiology**, Miami Beach, FL.
Comparative genomics approach to the evolution of mitochondria.

74. **GRAY, M.W.** (1997) **Gordon Research Conference on RNA Editing**, Ventura, CA, Jan. 19-24.
Transfer RNA editing in Acanthamoeba castellanii mitochondria.
75. **BURGER, G., LANG, B.F. AND GRAY, M.W.** (1997) **2nd International Congress on Symbiosis**, Marine Biological Laboratory, Woods Hole, MA, Apr. 13-18.
Early evolution of protist mitochondria.
76. **GRAY, M.W.** (1997) **Howard Hughes Medical Institute Scientific Workshop on bcl-2 Protein and Mitochondrial Function**, HHMI Conference Center, Chevy Chase, MD, May 28-29.
Similarities and differences in mitochondrial genome organization and expression throughout the eukaryotic lineage.
77. **GRAY, M.W., BURGER, G., CEDERGREN, R., GOLDING, G.B., LEMIEUX, C., SANKOFF, D., TURMEL, M. AND LANG, B.F.** (1997) **41st Annual Meeting of the Genetics Society of Canada**, The University of Western Ontario, London, ON, June 17-20.
A genomics approach to mitochondrial DNA evolution.
78. **LANG, B.F., BURGER, G., O'KELLY, C.J. AND GRAY, M.W.** (1997) **10th International Congress on Protistology (ICOP-X)**, Sydney, Australia, July 21-25.
The mitochondrial DNA of Reclinomonas americana resembles a eubacterial genome in miniature.
79. **GRAY, M.W.** (1997) **Workshop on Molecular Evolution**, Marine Biological Laboratory and Canadian Institute for Advanced Research, Woods Hole, MA, Aug. 3-15.
A genomics approach to mitochondrial DNA evolution.
80. **GRAY, M.W.** (1997) **Workshop on Evolution: A Molecular Point of View**, Center for Advanced Studies in the Space Life Sciences, Marine Biological Laboratory, Woods Hole, MA, Oct. 24-26.
A genomics approach to mitochondrial DNA evolution.
81. **GRAY, M.W.** (1998) **Workshop on The Revolution in Systematics**, Fundación Ramón Areces, Madrid, Spain, Feb. 23-24.
Probing the origin and evolution of mitochondria: a genomic perspective.
82. **GRAY, M.W.** (1998) **Workshop on Plant Mitochondrial Genetics and Molecular Biology**, American Genetic Association, North Carolina State University, Raleigh, NC, May 23.
Genes and proteins of the transcriptional apparatus in wheat mitochondria.
83. **GRAY, M.W., LEMIEUX, C., BURGER, G., LANG, B.F., OTIS, C., PLANTE, I. AND TURMEL, M.** (1998) **International Congress on Plant Mitochondria: From Gene to Function (ICPM 98)**, Aronsborg, Sweden, June 22-27.
Mitochondrial genome organization and evolution within the green algae and land plants.
84. **GRAY, M.W.** (1998) **12th Annual Meeting, Program in Evolutionary Biology, Canadian Institute for Advanced Research**, Mont-Rolland, QC, July 25-29.
Small nuclear and nucleolar RNAs in Euglena gracilis.

85. LANG, B.F., **GRAY, M.W.**, O'KELLY, C.J. AND BURGER, G. (1998) **Joint Symposium (*Origins of Mitochondria and Chloroplasts*) of the International Society of Evolutionary Protistology (ISEP), the Society of Protozoology (SOP) and the Phycological Society of America (PSA)**, Flagstaff, AZ, Aug. 4.
A comparative genomics approach to the evolution of mitochondria.
86. **GRAY, M.W.** (1998) **ATCC Symposium on *Bioinformatics and Biodiversity***, American Type Culture Collection, Manassas, VA, Nov. 6.
A comparative genomics strategy applied to questions of mitochondrial origin and evolution.
87. **GRAY, M.W.** (1999) **Gordon Research Conference on *RNA Editing***, Ventura, CA, Jan. 24-29.
A novel nucleotide incorporation activity implicated in the editing of mitochondrial transfer RNAs in Acanthamoeba castellanii.
88. **GRAY, M.W.** (1999) **CIAR All-Programs Congress**, Banff, AB, May 20-23.
From RNA to us.
(Session III - Evolutionary Biology)
89. LANG, B.F., **GRAY, M.W.**, O'KELLY, C.J. AND BURGER, G. (1999) **7th Annual Conference of the Society for Molecular Biology and Evolution**, Brisbane, Australia, July 11-14.
A comparative genomics approach to the evolution of mitochondria.
90. G. BURGER, LANG, F.B., LEMIEUX, C., TURMEL, M. AND **GRAY, M.W.** (1999) **XVI International Botanical Congress**, St. Louis, MO, Aug. 1-7.
Early evolution of eukaryotes from a mitochondrial perspective.
(General Symposium on ***Phylogeny of Life: The Bacterial Perspective on Eukaryotic and Prokaryotic Evolution***)
91. **GRAY, M.W.** (1999) **XVI International Botanical Congress**, St. Louis, MO, Aug. 1-7.
Mitochondrial genome evolution.
(Keynote Symposium on ***Genome Evolution***)
92. **GRAY, M.W.** (1999) **13th Annual Meeting, Program in Evolutionary Biology, Canadian Institute for Advanced Research**, Banff, AB, Oct. 20-24.
Thoughts on the evolution of the eukaryotic rRNA processing system.
93. **GRAY, M.W.**, LANG, B.F. AND BURGER, G. (2000) **6th International Congress of Plant Molecular Biology**, Québec, Canada, June 18-24.
The sisterhood of red and green algae: a mitochondrial perspective.
94. BURGER, G., **GRAY, M.W.** AND LANG, B.F. (2000) **13th Meeting of the International Society of Evolutionary Protistology (ISEP)**, Ceske Budejovice, Czech Republic, July 31-Aug. 4.
Unusual structures of mitochondrial genomes in protists.
95. **GRAY, M.W.** (2000) **EMBO Workshop on *Origins of Cells and Organelles***, Höör, Sweden, Sept. 8-11.
Mitochondrial evolution.

96. **GRAY, M.W.** (2000) **14th Annual Meeting, Program in Evolutionary Biology, Canadian Institute for Advanced Research**, Digby Pines, Digby, NS, Oct. 11-15.
Evolution of the mitochondrial genome within the green algal/land plant lineage.
97. **GRAY, M.W.** (2000) **Symposium on New Therapies and the Genome**, Montréal, QC, Nov. 26-29.
Mitochondrial genomics and evolution.
98. **GRAY, M.W.** (2001) **Gordon Research Conference on RNA Editing**, Ventura, CA, Jan. 21-26.
Mitochondrial transfer RNA editing in amoeboid protozoa.
99. **GRAY, M.W.**, LANG, B.F. AND BURGER, G. (2001) **Bari Meeting on Mitochondria: Evolution, Genomics, Homeostasis and Pathology**, Selva di Fasano, Italy, May 9-12.
Evolution of a mitochondrial tRNA editing system.
100. **LANG, B.F.**, **GRAY, M.W.** AND BURGER, G. (2001) **44th Annual Meeting of the Canadian Society of Biochemistry and Molecular & Cellular Biology**, Alliston, ON, May 31-June 3.
Lessons from the comparative analysis of primitive mitochondrial genomes.
(The CIAR Symposium on **Comparative and Evolutionary Genomics**)
101. **BURGER, G.**, **GRAY, M.W.** AND LANG, B.F. (2002) **Gordon Research Conference on Molecular Evolution**, Ventura, CA, Jan. 13-18.
Primitive eukaryotes from a mitochondrial genomics perspective
102. **LANG, B.F.**, **GRAY, M.W.** AND BURGER, G. (2002) **Spring Academy of the German Society of Genetics**, Wittenberg, Germany.
Eukaryotic evolution from a mitochondrial perspective.
103. **LANG, B.F.**, **GRAY, M.W.** AND BURGER G (2002) **14th Meeting of the International Society of Evolutionary Protistology (ISEP XIV)**, Vancouver, BC, June 19-22.
Phylogeny of early mitochondriate eukaryotes: the jakobid flagellates.
104. **GRAY, M.W.** AND **WATKINS, R.F.** (2002) **16th Annual Meeting, Program in Evolutionary Biology, Canadian Institute for Advanced Research**, Harrison Hot Springs Resort, BC, Sept. 28 - Oct. 2.
The Protist EST Program (PEP) and EST exploration of Acanthamoeba castellanii.
105. **GRAY, M.W.** (2002) **Microbial Evolution: Concepts and Controversies**, Montréal, QC, Oct. 17-19.
Contemporary issues in mitochondrial origins and evolution.
106. **GRAY, M.W.** (2002) **Advances in Genome Technology and Bioinformatics**, Marine Biological Laboratory, Woods Hole, MA, Oct. 25.
Mitochondrial genome evolution.
107. **GRAY, M.W.** (2002) **Symposium on Evolutionary and Comparative Genomics**, Puerto Vallarta, Mexico, Nov. 1-4.
Evolution of mitochondrial genomes.

108. **GRAY, M.W.** (2002) **XXIV Meeting of the Mexican Society for Biochemistry**, Puerto Vallarta, Mexico, Nov. 4.
Evolution of a mitochondrial transfer RNA editing system.
(Plenary Mini-Symposium on **Genomes and Evolution**)
109. **GRAY, M.W.** (2002) **Lund Life Science Symposium on Evolutionary Genomics**, Lund University, Lund, Sweden, Dec. 4.
The mitochondrial genome: extraordinarily variable structure but common evolutionary origin.
110. **GRAY, M.W.** (2003) **4th International Symbiosis Society Congress**, St. Mary's University, Halifax, Nova Scotia, Aug. 17-23.
From bacterial symbiont to organelle: Unravelling the evolutionary history of the mitochondrial genome.
(Symposium 15: **Evolutionary Implications of Symbiosis**)
111. **RUSSELL, A.** AND **GRAY, M.W.** (2003) **17th Annual Meeting, Program in Evolutionary Biology, Canadian Institute for Advanced Research**, White Point Beach, NS, Sept. 10-14.
Modification guide RNAs in Euglena gracilis.
112. **GRAY, M.W.** (2003) **11th International Conference on Microbial Genomes**, Durham, NC, Sept. 28-Oct. 2
Evolution of the mitochondrial genome: a study in extraordinary structural variation.
113. **BURGER, G., LANG, B.F.** AND **GRAY, M.W.** (2003) **Mol. Cell. Proteomics 2**, 918.
Diversity and evolution of mitochondrial genome architecture and information content.
(Symposium on **Mitochondrial Biogenesis and Evolution, HUPO 2nd Annual & IUBMB XIX World Congress**, Montreal, QC, Oct. 8-11, 2003)
114. **GRAY, M.W.** (2003) **Mol. Cell. Proteomics 2**, 918.
Diversity and evolution of mitochondrial RNA editing systems.
(Symposium on **Mitochondrial Biogenesis and Evolution, HUPO 2nd Annual & IUBMB XIX World Congress**, Montreal, QC, Oct. 8-11, 2003)
115. **WATKINS, R.F.** AND **GRAY, M.W.** (2004) **Frontiers in Genomics: Insights into Protist Evolutionary Biology**, University of Iowa, IW.
The Protist EST Program.
116. **GRAY, M.W.** (2004) **Gordon Research Conference on Mitochondria & Chloroplasts**, Kimball Union Academy, Meriden, NH, Jul 25-30.
Mitochondrial evolution: going off in all directions.
117. **WATKINS, R.F.** AND **GRAY, M.W.** (2004) **18th Annual Meeting, Program in Evolutionary Biology, Canadian Institute for Advanced Research**, Hotel du Lac Carling, QC, Oct. 13-17.
LGT in bacterivorous eukaryotes: the results of stringent scans of amoebozoan EST libraries.

118. **GRAY, M.W.** (2005) **International Conference on *Microbial Genomes***, Halifax, NS, Apr. 13-16.
The Protist EST Program: an exploration of diversity and evolution within the world of eukaryotic microbes.
119. **GRAY, M.W.** (2006) **The Kurland Symposium**, Uppsala University, Uppsala, Sweden, Apr. 7.
Speculations on the origin and evolution of RNA editing.
120. **GRAY, M.W.** (2006) **Canadian Society of Microbiologists-Genetics Society of Canada 2006 Conference**, London, ON, June 18-21.
The Protist EST Program: an exploration of genetic diversity and evolution within the world of eukaryotic microbes.
121. **GRAY, M.W.** (2007) **Gordon Research Conference on *RNA Editing***, Ventura, CA, Jan. 14-19.
Biochemistry of mitochondrial 5' tRNA editing.
122. **GRAY, M.W.** (2007) **FEBS Advanced Lecture Series, *Mitochondria in Life, Death and Disease***, Aussois, France, Apr. 25-29.
Genomics vs. proteomics: two views of mitochondrial evolution.
(Symposium I: *Mitochondrial Evolution*)
123. **GRAY, M.W.** (2007) **3rd Genome Training Grant Symposium, *Evolution of the Mitochondrial Genome***, University of Washington, Seattle, WA, June 12.
Genomics vs. proteomics: different views of mitochondrial evolution.
124. **GRAY, M.W.** (2008) **PROTIST2008 (ISOP59/ISEPXVII)**, Dalhousie University, Halifax, NS, July 21-26.
Spectacular and bizarre: RNA editing and its evolution in protists.
(Invited Plenary Speaker)
125. **GRAY, M.W.** (2008) **Gordon Research Conference on *Mitochondria & Chloroplasts***, University of New England, Biddeford, ME, Aug. 10-15.
Two views of mitochondrial evolution: genomics vs. proteomics.
126. **GRAY, M.W.** (2009) **International Conference for Plant Mitochondrial Biology (ICPMB)**, Grandlibakken Conference Center & Lodge, Lake Tahoe, CA, May 9-14.
First among equals: evolution of the plant mitochondrial genome.
127. **LEGER, M., GAWRYLUK, R.M.R., GRAY, M.W. AND ROGER, A.J.** (2009) **18th Meeting of the International Society for Evolutionary Protistology (ISEP)**, Kanazawa, Japan, July 2-7.
*Anaerobic metabolism enzymes in *Acanthamoeba castellanii*.*
128. **HOPKINS, J.F., SPENCER, D.F., GRAY, M.W. AND ARCHIBALD, J.M.** (2009) **Annual Meeting of the Society of Molecular Biology and Evolution (SMBE 2010)**, Lyon Convention Center, Lyon, France, July 4-8.
*Proteomics reveals complex evolution of plastid- and nucleomorph-targeted proteins in the chlorarachniophyte *Bigeloviella*.*

129. **GRAY, M.W.** (2009) **Joint Symposium of German Academy of Sciences Leopoldina, SFB 429 and SFB-TR1, Molecular Genetics of Chloroplasts and Mitochondria**, Free University of Berlin, Berlin, Germany, Sept. 20-23.
Genomics vs, proteomics: two views of mitochondrial evolution.
130. **GRAY, M.W.** (2011) **Gordon Research Conference on RNA Editing: Editing and Modification of RNA and DNA**, Galveston, TX, Jan. 9-14.
The evolutionary origin of RNA editing.
131. **GRAY, M.W.** (2011) **EMBO Conference on Comparative Genomics of Eukaryotic Microorganisms**, Sant Feliu de Guixols, Girona, Spain, Oct. 15-20.
Mitochondrial DNA and mitochondrial genes in Euglena gracilis.
132. **GRAY, M.W.** (2012) **Mitochondrial Medicine 2012: Capitol Hill, From Genomics and Systems Biology to Translation**, Washington, DC, June 13-16
Genomics vs. proteomics: two views of mitochondrial evolution
(Session on **Genomics of Mitochondrial Biology**)
133. **GRAY, M.W.** (2013) **International Congress of Protistology (ICOP XIV)**, Vancouver, BC, July 28-Aug. 2.
Mitochondrial evolution: genome vs. proteome
(Symposium 7: **Organelles & Endosymbionts**)
134. **GRAY, M.W.** (2013) **12th International Colloquium, Endocytobiology and Symbiosis**, Halifax, NS, Aug. 18-22.
Genome vs. proteome: an updated perspective on the origin of the mitochondrion
135. **GRAY, M.W.** (2014) **Arthur M. Sackler Colloquium, Symbioses Becoming Permanent: The Origins and Evolutionary Trajectories of Organelles**, Beckman Center, Irvine, CA, Oct. 15-17.
One from two (or more): mergers, acquisitions, downsizing and innovation in eukaryotic cell evolution
(Distinctive Voices Public Lecture)
136. **Gray, M.W.** (2015) **Society for General Microbiology Annual Conference 2015**, Birmingham, U.K., Mar. 30-Apr. 2.
The pre-endosymbiont hypothesis: a new look at the origin of mitochondria
(Session S9: **Mitochondria and Related Organelles in Microbial Eukaryotes**)
137. **Gray, M.W.** (2015) **MitoCross Symposium 2015: Mitochondria at the Crossroad**, Strasbourg, France, Sept. 21-22.
Properties and evolution of a mitochondrial tRNA editing system
138. **GRAY, M.W.** (2015) **EMBO Conference on Exploring the genomic complexity and diversity of eukaryotes**, Sant Feliu de Guixols, Girona, Spain, Oct. 17-22.
Mitochondrial genomes—anything goes
(Opening Lecture)
139. **GRAY, M.W.** (2016) **Evolution of Cells, Genomes and Proteins**, Nanyang Technological University, Singapore, Feb. 1-3.
Mitochondrial evolution: what, how and why

140. **GRAY, M.W.** (2016) *Evolution of Cells, Genomes and Proteins*, Bintan, Indonesia, Feb. 4-6.
Properties and evolution of a tRNA editing enzyme
141. **GRAY, M.W.** (2017) 115th International Titisee Conference on *Evolutionary Mitochondrial Biology: Molecular, Biochemical, and Metabolic Diversity*, Schwarzwaldhotel Titisee, Mar. 29–Apr. 2.
The mitochondrial proteome of Andaluca godoyi, an early-diverging eukaryote with the most gene-rich mitochondrial genome
142. **GRAY, M.W.** (2018) Cold Spring Harbor Laboratory Meeting on *The Evolving Concept of Mitochondria: From Symbiotic Origins to Therapeutic Opportunities*, Cold Spring Harbor, NY, Oct. 18-21.
What do we really know about the origin of mitochondria?

VII. Contributed Conference Presentations

(Presenter's name underlined)

1. **GRAY, M.W.** (1974) *Proc. Can. Fed. Biol. Soc.* **17**, 116.
Distinctive species of RNA in a highly-purified mitochondrial fraction from wheat embryos.
(17th Annual Meeting of the Canadian Federation of Biological Societies, McMaster University, Hamilton, ON, June 25-28)
2. **CUNNINGHAM, R.S.**, BONEN, L., DOOLITTLE, W.F. AND **GRAY, M.W.** (1976) *Proc. Can. Fed. Biol. Soc.* **19**, 121.
Nucleotide sequence analysis of wheat cytosol and mitochondrial ribosomal RNA.
(19th Annual Meeting of the Canadian Federation of Biological Societies, Dalhousie University, Halifax, NS, June 15-18)
3. **GRAY, M.W.** (1977) *Ribosome Workshop II*, Memorial University of Newfoundland, St. John's, NF, July 19-21.
The mitochondrial ribosomal RNAs of germinating wheat embryos.
4. **BONEN, L.** AND **GRAY, M.W.** (1979) *N.A.T.O. Advanced Studies Institute, F.E.B.S. Advanced Course on Genome Organization and Expression in Plants*, University of Edinburgh, Edinburgh, Scotland, July 11-21.
Mapping of genes for wheat mitochondrial ribosomal and transfer RNAs.
5. SPENCER, D.F., BONEN, L. AND **GRAY, M.W.** (1980) *12th International Bari Conference on Mitochondrial, The Organization and Expression of the Mitochondrial Genome*, Martina Franca, Italy, June 23-28.
Primary sequence of wheat mitochondrial 5S ribosomal RNA: functional and evolutionary implications.
6. SPENCER, E.F., BONEN, L. AND **GRAY, M.W.** (1980) *E.M.B.O. - F.E.B.S. tRNA Workshop*, Strasbourg, France, July 16-21.
Primary sequence of wheat mitochondrial 5S ribosomal RNA: evolutionary considerations and implications for interaction with mitochondrial transfer RNAs.
7. **GRAY, M.W.**, BONEN, L., FALCONET, D., HUH, T.Y., SCHNARE, M.N. AND SPENCER, D.F. (1981) *Mitochondrial Genes*, Cold Spring Harbor Laboratory, Cold Spring Harbor, NY, May 13-17.
Sequences of plant mitochondrial ribosomal RNAs and organization of their genes.
8. **SPENCER, D.F.**, BONEN, L. AND **GRAY, M.W.** (1981) *The Evolution of the Eukaryotic Genome and Its Components*, Dalhousie University, Halifax, NS, July 12-15.
Primary sequence of wheat mitochondrial 5S ribosomal RNA: functional and evolutionary implications.

9. SCHNARE, M.N. AND **GRAY, M.W.** (1981) ***The Evolution of the Eukaryotic Genome and Its Components***, Dalhousie University, Halifax, NS, July 12-15.
Sequences of unusual ribosomal RNAs from Crithidia fasciculata, a trypanosomatid protozoan.
10. SCHNARE, M.N. AND GRAY, M.W. (1982) ***Proc. Can. Fed. Biol. Soc.* 25**, 108.
Eubacterial properties of the 3'-terminal sequence of wheat mitochondrial 18S ribosomal RNA.
(25th Annual Meeting of the Canadian Federation of Biological Societies, University of Alberta, Edmonton, AB, June 14-18)
11. SCHNARE, M.N. AND GRAY, M.W. (1982) **N.A.T.O. Advanced Studies Institute, F.E.B.S. Advanced Course on Structure and Function of Plant Genomes**, Porto Portese, Italy, Aug. 23-Sept. 2.
Eubacterial properties of the 3'-terminal sequence of wheat mitochondrial 18S ribosomal RNA.
12. SCHNARE, M.N. AND **GRAY, M.W.** (1983) **Meeting on RNA Processing**, Cold Spring Harbor Laboratory, Cold Spring Harbor, NY, May 18-22.
The 3'-terminal sequence of wheat mitochondrial 26S rRNA.
13. BONEN, L., BOER, P.H. AND **GRAY, M.W.** (1984) **EMBO Workshop on Plant Mitochondrial DNA: Organization, Information Content, Expression**, Melrose, Scotland, May 21-25.
Protein coding genes in wheat mitochondria.
14. BONEN, L., BOER, P.H. AND **GRAY, M.W.** (1985) **First Canadian Plant Molecular Biology Workshop**, University of Guelph, Guelph, ON, May 27-28.
Protein coding genes in wheat mitochondria.
15. BONEN, L., BOER, P.H. AND **GRAY, M.W.** (1985) **13th International Congress of Biochemistry**, Amsterdam, The Netherlands, Aug. 25-30.
Protein coding genes in wheat mitochondria.
16. BOER, P.H. AND **GRAY, M.W.** (1985) **13th International Congress of Biochemistry**, Amsterdam, The Netherlands, Aug. 25-30.
Expression of the mitochondrial genome of Chlamydomonas reinhardtii.
17. BONEN, L., BOER, P.H. AND **GRAY, M.W.** (1985) **International Symposium on Achievements and Perspectives in Mitochondrial Research**, Bari, Italy, Sept. 2-6.
Protein coding genes in wheat mitochondria.
18. BOER, P.H. AND **GRAY, M.W.** (1985) **International Symposium on Achievements and Perspectives in Mitochondrial Research**, Bari, Italy, Sept. 2-6.
Expression of the mitochondrial genome of Chlamydomonas reinhardtii.
19. BONEN, L., BOER, P.H. AND **GRAY, M.W.** (1985) **Abstracts of the First International Congress of Plant Molecular Biology**, Savannah, GA, Oct. 28-Nov. 2; pg. 39.
Protein coding genes in wheat mitochondria.

20. **GRAY, M.W.** AND CLAYTON, D.A. (1986) **J. Cell Biochem. Suppl. 10D**, 117.
Characterization of a mouse mitochondrial transcription system.
(Cetus-UCLA Symposium on **Transcriptional Control Mechanisms**, Keystone, CO, Apr. 6-13)
21. **LEMIEUX, C.**, TURMEL, M., BOULANGER, J. AND **GRAY, M.W.** (1986) **International Research Conference on Extrachromosomal Elements in Lower Eukaryotes**, University of Illinois at Urbana-Champaign, Urbana, IL, June 1-5.
Sequence analysis of the chloroplast gene for the large subunit ribosomal RNA from the green alga Chlamydomonas eugametos.
22. HEINONEN, T.Y.K., SCHNARE, M.N., **YOUNG, P.G.** AND **GRAY, M.W.** (1986) **International Research Conference on Extrachromosomal Elements in Lower Eukaryotes**, University of Illinois at Urbana-Champaign, Urbana, IL, June 1-5.
Discontinuous ribosomal RNAs in Tetrahymena pyriformis mitochondria.
23. **LEMIEUX, C.**, TURMEL, M., BOULANGER, J. AND **GRAY, M.W.** (1986) **First Annual Workshop of the Canadian Society for Plant Molecular Biology**, Erindale Campus of the University of Toronto, Mississauga, ON, June 5-7.
Sequence analysis of the chloroplast gene for the large subunit ribosomal RNA from the green alga Chlamydomonas eugametos.
24. **GRAY, M.W.** AND CLAYTON, D.A. (1986) **Proc. Can. Fed. Biol. Soc. 29**, 156.
Characterization of a mouse mitochondrial transcription system.
(29th Annual Meeting of the Canadian Federation of Biological Societies, University of Guelph, Guelph, ON, June 16-20)
25. **SCHNARE, M.N.**, HEINONEN, T.Y.K., YOUNG, P.G. AND **GRAY, M.W.** (1986) **Proc. Can. Fed. Biol. Soc. 29**, 191.
Discontinuous ribosomal RNAs in Tetrahymena pyriformis mitochondria.
(29th Annual Meeting of the Canadian Federation of Biological Societies, University of Guelph, Guelph, ON, June 16-20)
26. **SANKOFF, D.**, ABEL, Y., CEDERGREN, R. AND **GRAY, M.W.** (1987) **UCLA-CIAR Western Winter Workshop on The Evolution of Genes and Genomes**, Lake Tahoe, CA, Mar. 4-7.
Validating branching sequences in a parsimonious phylogeny.
27. SPENCER, D.F., COLLINGS, J.C., **SCHNARE, M.N.** AND **GRAY, M.W.** (1987) **Meeting on RNA Processing**, Cold Spring Harbor Laboratory, Cold Spring Harbor, NY, May 13-17.
Multiple spacer sequences in the nuclear large subunit ribosomal RNA gene in Crithidia fasciculata.
28. SPENCER, D.F. AND **GRAY, M.W.** (1987) **Joint Meeting Canadian Society of Plant Physiologists and Canadian Society for Plant Molecular Biology**, Queen's University, Kingston, ON, June 9-12.
Analysis of the 18S ribosomal DNA repeats in the wheat mitochondrial genome.

29. JOYCE, P.B.M., SPENCER, D.F., BONEN, L. AND **GRAY, M.W.** (1987) **Joint Meeting Canadian Society of Plant Physiologists and Canadian Society for Plant Molecular Biology**, Queen's University, Kingston, ON, June 9-12.
Wheat mitochondrial transfer RNA genes.
30. LEMIEUX, C., BOULANGER, J., GAUTHIER, A., **GRAY, M.W.**, LEE, R.W. AND TURMEL, M. (1987) **Joint Meeting Canadian Society of Plant Physiologists and Canadian Society for Plant Molecular Biology**, Queen's University, Kingston, ON, June 9-12.
Intron-mediated gene conversion in the chloroplast of Chlamydomonas.
31. BOER, P.H. AND **GRAY, M.W.** (1987) **Meeting on Molecular Biology of Mitochondria and Chloroplasts**, Cold Spring Harbor Laboratory, Cold Spring Harbor, NY, Aug. 25-30.
Scrambled rRNA gene pieces in algal mitochondria.
32. JOYCE, P.B.M., SPENCER, D.F., BONEN, L. AND **GRAY, M.W.** (1987) **Meeting on Molecular Biology of Mitochondria and Chloroplasts**, Cold Spring Harbor Laboratory, Cold Spring Harbor, NY, Aug. 25-30.
Wheat mitochondrial tRNA genes.
33. **GRAY, M.W.**, COOK, J.R. AND SCHNARE, M.N. (1988) **J. Cell Biochem. Suppl. 12D**, 20.
A highly fragmented large subunit RNA in the cytoplasmic ribosome of Euglena gracilis. (Director's Sponsors - UCLA Symposium on *Molecular Biology of RNA*, Keystone, CO, Apr. 3-10).
34. CEDERGRÉN, R., **GRAY, M.W.**, ABEL, Y. AND SANKOFF, D. (1988) **J. Cell Biochem. Suppl. 12D**, 70.
Evolutionary relationships inferred from ribosomal RNA sequences. (Director's Sponsors - UCLA Symposium on *Molecular Biology of RNA*, Keystone, CO, Apr. 3-10).
35. JOYCE, P.B.M., SPENCER, D.F. AND **GRAY, M.W.** (1988) **XVIth International Congress of Genetics**, Toronto, ON, Aug. 20-27.
Rearrangements in sequences flanking duplicate, identical proline transfer RNA genes in wheat mitochondrial DNA.
36. SCHNARE, M.N., COOK, J.R. AND **GRAY, M.W.** (1988) Cold Spring Harbor Meeting on *Ribosome Synthesis*, Cold Spring Harbor, NY, Sept. 21-25.
Nuclear genes encoding discontinuous large subunit ribosomal RNAs in Crithidia fasciculata and Euglena gracilis.
37. JOYCE, P.B.M. AND **GRAY, M.W.** (1989) **Joint Annual Meeting of the Genetics Society of Canada and the Canadian Society for Plant Molecular Biology**, University of Calgary, Calgary, AB, June 11-14.
Chloroplast-like transfer RNA genes expressed in wheat mitochondria.
38. **GRAY, M.W.** AND HANIC-JOYCE, P.J. (1989) **32nd Annual Meeting of the Canadian Federation of Biological Societies**, University of Calgary, Calgary, AB, June 14-17.
Processing of tRNA precursors in a wheat mitochondrial extract.
39. COVELLO, P.S. AND **GRAY, M.W.** (1990) **University of Florida Winter Organelle Meeting**, Clearwater, FL, Feb. 22-25.
RNA editing in plant mitochondria: an interspecific comparison.

40. LONERGAN, K. AND **GRAY, M.W.** (1990) **University of Florida Winter Organelle Meeting**, Clearwater, FL, Feb. 22-25.
A polyphyletic origin of mitochondria?
41. COULTHART, M.B. AND **GRAY, M.W.** (1990) **Fifth Annual Meeting of the Canadian Society for Plant Molecular Biology**, Dalhousie University, Halifax, NS, June 11-13.
An approach to rapid physical mapping of plant mitochondrial genomes.
42. AUCHINCLOSS, A.H., MENASSA, R., SINGH, M., COVELLO, P.S., **GRAY, M.W.** AND BROWN, G.G. (1990) **Fifth Annual Meeting of the Canadian Society for Plant Molecular Biology**, Dalhousie University, Halifax, NS, June 11-13.
Transcription initiation sites of the soybean mitochondrial genome.
43. COVELLO, P.S. AND **GRAY, M.W.** (1990) **Fifth Annual Meeting of the Canadian Society for Plant Molecular Biology**, Dalhousie University, Halifax, NS, June 11-13.
RNA editing in plant mitochondria: an interspecific comparison.
44. LONERGAN, K. AND **GRAY, M.W.** (1990) **Fifth Annual Meeting of the Canadian Society for Plant Molecular Biology**, Dalhousie University, Halifax, NS, June 11-13.
Tracing the origin of plant mitochondria.
45. SCHNARE, M.N., COOK, J.R. AND **GRAY, M.W.** (1990) **Fifth Annual Meeting of the Canadian Society for Plant Molecular Biology**, Dalhousie University, Halifax, NS, June 11-13.
*Sixteen discrete RNA components in the cytoplasmic ribosome of *Euglena gracilis*.*
46. LONERGAN, K. AND GRAY, M.W. (1990) **4th Annual Meeting, Program in Evolutionary Biology, Canadian Institute for Advanced Research**, Chaffey's Locks, ON, Aug. 25-29.
*The phylogenetic position of *Acanthamoeba* mitochondria.*
47. GRAY, M.W. AND COVELLO, P.S. (1992) **35th Annual Meeting of the Canadian Federation of Biological Societies**, Victoria, BC, June 18-20.
Evolutionary transfer of the cytochrome oxidase subunit 2 gene from the mitochondrion to the nucleus in soybean.
48. GLOVER, K.E. AND **GRAY, M.W.** (1992) **6th Annual Meeting, Program in Evolutionary Biology, Canadian Institute for Advanced Research**, Lunenburg, NS, Sept. 12-15.
The genetic origin of transfer RNAs in wheat mitochondria.
49. GREENWOOD, S.J. AND **GRAY, M.W.** (1992) **6th Annual Meeting, Program in Evolutionary Biology, Canadian Institute for Advanced Research**, Lunenburg, NS, Sept. 12-15.
**Euglena* rRNA processing: an example of the RNA world falling to pieces.*
50. COVELLO, P.S. AND **GRAY, M.W.** (1992) **6th Annual Meeting, Program in Evolutionary Biology, Canadian Institute for Advanced Research**, Lunenburg, NS, Sept. 12-15.
*Silent mitochondrial and active nuclear genes for subunit 2 of cytochrome c oxidase (*cox2*) in soybean: evidence for RNA-mediated gene transfer.*

51. PLANTE, I., DENIS, S., ZHU, Y., WONG, Z., LONERGAN, K.M., GRAY, M.W. AND BURGER, G. (1992) **6th Annual Meeting, Program in Evolutionary Biology, Canadian Institute for Advanced Research**, Lunenburg, NS, Sept. 12-15.
Sequence of the Acanthamoeba castellanii mitochondrial genome.
52. COVELLO, P.S. AND GRAY, M.W. (1992) **HFSP-Workshop on RNA Editing in Plant Mitochondria and Chloroplasts - Comparison with RNA Editing Processes in Trypanosomes, Physarum and Mammalia**, Berlin, Germany, Sept. 15-20.
Silent mitochondrial and active nuclear genes for subunit 2 of cytochrome c oxidase (cox2) in soybean: evidence for RNA-mediated gene transfer.
53. LITTLEJOHN, T., FORGET, L., GRAY, M., GREENWOOD, S., LANG, B.F., LONERGAN, K., PAQUIN, B., PLANTE, I., ROEWER, I., SCHNARE, M., WANG, Z., ZHU, Y. AND BURGER, G. (1993) **First International Symposium on Mapping and Sequencing of Small Genomes**, Paris, France, Mar. 28-30.
Phylogenetic analysis of organellar genomes.
54. BURGER, G., CEDERGREN, R., GOLDING, B., GRAY, M.W., LANG, B.F., LEMIEUX, C., SANKOFF, D. AND TURMEL, M. (1993) **7th Annual Meeting, Program in Evolutionary Biology, Canadian Institute for Advanced Research**, Banff, AB, Oct. 20-23.
The organelle genome sequencing project.
55. GLOVER, K.E. AND GRAY, M.W. (1994) **4th International Congress of Plant Molecular Biology**, Amsterdam, Netherlands, June 19-24.
The genetic origin of transfer RNAs in wheat mitochondria.
56. GREENWOOD, S.J., SCHNARE, M.N. AND GRAY, M.W. (1994) **10th Biennial Meeting of the International Society for Evolutionary Protistology (ISEP-10)**, Dalhousie University, Halifax, NS, Aug. 4-10.
The U3 snoRNA of Euglena gracilis.
57. GLOVER, K. AND GRAY, M.W. (1994) **8th Annual Meeting, Program in Evolutionary Biology, Canadian Institute for Advanced Research**, Dalhousie University, Halifax, NS, Aug. 10-14.
The genetic origin of tRNAs in wheat mitochondria.
58. GREENWOOD, S.J., SCHNARE, M.N. AND GRAY, M.W. (1994) **8th Annual Meeting, Program in Evolutionary Biology, Canadian Institute for Advanced Research**, Dalhousie University, Halifax, NS, Aug. 10-14.
The U3 snoRNA of Euglena gracilis.
59. IKEDA, T. AND GRAY, M.W. (1994) **8th Annual Meeting, Program in Evolutionary Biology, Canadian Institute for Advanced Research**, Dalhousie University, Halifax, NS, Aug. 10-14.
Characterization of protein factors involved in transcription in wheat mitochondria.
60. PRICE, D. AND GRAY, M.W. (1994) **8th Annual Meeting, Program in Evolutionary Biology, Canadian Institute for Advanced Research**, Dalhousie University, Halifax, NS, Aug. 10-14.
tRNA processing in the mitochondria of Acanthamoeba castellanii.

61. SMALLMAN, D. AND **GRAY, M.W.** (1994) **8th Annual Meeting, Program in Evolutionary Biology, Canadian Institute for Advanced Research**, Dalhousie University, Halifax, NS, Aug. 10-14.
Probing the conformation of Euglena gracilis LSU rRNA.
62. IKEDA, T. AND **GRAY, M.W.** (1995) **Plant Mitochondria: From Gene to Function**, Duke University, Durham, NC, Apr. 7-12.
Characterization of protein factors involved in transcription in wheat mitochondria.
63. LITTLEJOHN, T.G., BURGER, G., **GRAY, M.W.**, KORAB-LASKOWASKA, M. AND LANG, B.F. (1995) **2nd Meeting on the Interconnection of Molecular Biology Databases (MIMBD-95)**, Cambridge University, England, July 20-22.
The organelle genome database project (GOBASE).
64. CERMAKIAN, N., IKEDA, T.M., CEDERGREN, R.J. AND **GRAY, M.W.** (1995) **9th Annual Meeting, Program in Evolutionary Biology**, Canadian Institute for Advanced Research, Val Morin, QC, Aug. 23-27.
Widespread distribution of T3/T7-type RNA polymerase genes in eukaryotes.
65. BURGER, G., CEDERGREN, R.J., GOLDING, B., **GRAY, M.W.**, LASKOWSKA, M., LANG, B.F., LEMIEUX, C., LITTLEJOHN, T.G., RIOUX, P., SANKOFF, D. AND TURMEL, M. (1996) **Annual Meeting of the Genetics Society of Canada**, University of Manitoba, Winnipeg, MB, June 12-15.
Bioinformatics projects of the organelle genome and database program.
66. KORAB-LASKOWASKA, M., RIOUX, P., LANG, B.F., BURGER, G., **GRAY, M.W.** AND LITTLEJOHN, T.G. (1996) **3rd Meeting on the Interconnection of Molecular Biology Databases (MIMBD-96)**, St. Louis, MO, June 12-15, 1996.
The organelle genome database project (GOBASE).
67. IKEDA, T.M. AND **GRAY, M.W.** (1996) **Gordon Research Conference on Mitochondria and Chloroplasts**, Plymouth State College, Plymouth, NH, June 16-21.
Characterization of a protein factor implicated in transcription in wheat mitochondria.
68. CERMAKIAN, N., IKEDA, T.M., **GRAY, M.W.** AND CEDERGREN, R. (1996) **Gordon Research Conference on Mitochondria and Chloroplasts**, Plymouth State College, Plymouth, NH, June 16-21.
Evolution and distribution of T7-type RNA polymerases in eukaryotes.
69. LITTLEJOHN, T.G., LANG, B.F., **GRAY, M.**, BURGER, G., KORAB-LASKOWSKA, M. AND RIOUX, P. (1997) **Conference on Organisation and Expression of the Genome**, Lorne, Victoria, Australia, Feb. 17-21.
GOBASE- The Organelle Genome Database Project.
70. BURGER, G., FARMER, M.A., **GRAY, M.W.**, LANG, B.F., NERAD, T.A. AND O'KELLY, C.J. (1997) **7th East Coast Conference on Protistology**, University of Rhode Island, Narragansett Bay Campus, Narragansett, RI, May 21-23.
The jakobid and retortamonad flagellates: keys to understanding early events in mitochondrial eukaryote evolution.

71. LANG, B.F., BURGER, G., O'KELLY, C.J. AND GRAY, M.W. (1997) **10th International Congress on Protistology (ICOP-X)**, Sydney, Australia, July 21-25.
The mitochondrial DNA of Reclinomonas resembles a eubacterial genome in miniature.
72. IKEDA, T.M. AND GRAY, M.W. (1998) **International Congress on Plant Mitochondria: From Gene to Function (ICPM 98)**, Aronsborg, Sweden, June 22-27.
Biochemical characterization of the wheat mitochondrial transcription machinery.
73. EDQVIST, J., BURGER, G. AND GRAY, M.W. (1998) **International Congress on Plant Mitochondria: From Gene to Function (ICPM 98)**, Aronsborg, Sweden, June 22-27.
Mitochondrial gene expression in the ciliate Tetrahymena pyriformis.
74. WATANABE, Y.-I. AND GRAY, M. W. (1999) Fourth Annual Meeting of the RNA Society, University of Edinburgh, Scotland, June 23-27.
Cloning of the cDNA encoding Euglena gracilis fibrillarin.
75. IKEDA, T. M. AND GRAY, M.W. (1999) **XVI International Botanical Congress**, St. Louis, MO, Aug. 1-7.
Characterization of a DNA-binding protein implicated in transcription in wheat mitochondria.
76. CHARETTE, M., GREENWOOD, S.J., SCHNARE, M.N. AND GRAY, M.W. (2000) **14th Annual Meeting, Program in Evolutionary Biology, Canadian Institute for Advanced Research**, Digby Pines, Digby, NS, Oct. 11-15.
Organization of genes encoding U3 small nucleolar RNA in Euglena gracilis.
77. CHARETTE, M. AND GRAY, M.W. (2003) **Gordon Research Conference on RNA Editing**, Ventura, CA, Jan. 19-24.
Genes encoding U3 small nucleolar RNA are multi-copy and organized in a variety of contexts in Euglena gracilis.
78. RUSSELL, A.G., SCHNARE, M.N. AND GRAY, M.W. (2003) **Gordon Research Conference on RNA Editing**, Ventura, CA, Jan. 19-24.
Characterization of snoRNAs from Euglena gracilis.
79. LOHAN, A.J. AND GRAY, M.W. (2003) **Gordon Research Conference on RNA Editing**, Ventura, CA, Jan. 19-24.
Partial purification of a mitochondrial tRNA editing activity from Acanthamoeba castellanii.
80. LOHAN, A.J. AND GRAY, M.W. (2003) **17th Annual Meeting, Program in Evolutionary Biology, Canadian Institute for Advanced Research**, White Point Beach, NS, Sept. 10-14.
Partial purification of Acanthamoeba castellanii mitochondrial tRNA editing activity.
81. WATKINS, R.R. AND GRAY, M.W. (2003) **17th Annual Meeting, Program in Evolutionary Biology, Canadian Institute for Advanced Research**, White Point Beach, NS, Sept. 10-14.
Screening a Euglena gracilis EST library for lateral transfers.

82. SCHINDEL, E.T., LOHAN, A.J. AND **GRAY, M.W.** (2003) **17th Annual Meeting, Program in Evolutionary Biology, Canadian Institute for Advanced Research**, White Point Beach, NS, Sept. 10-14.
Editing of mitochondrial tRNAs in Polysphondylium pallidum.
83. SHUTT, T. AND **GRAY, M.W.** (2003) **17th Annual Meeting, Program in Evolutionary Biology, Canadian Institute for Advanced Research**, White Point Beach, NS, Sept. 10-14.
Evolution of the mitochondrial transcription apparatus.
84. BULLERWELL, C.E., SCHNARE, M.N. AND **GRAY, M.W.** (2003) **17th Annual Meeting, Program in Evolutionary Biology, Canadian Institute for Advanced Research**, White Point Beach, NS, Sept. 10-14.
Discovery and characterization of Acanthamoeba castellanii mitochondrial 5S ribosomal RNA.
85. BULLERWELL, C.E. AND **GRAY, M.W.** (2003) **17th Annual Meeting, Program in Evolutionary Biology, Canadian Institute for Advanced Research**, White Point Beach, NS, Sept. 10-14.
tRNA editing in the mitochondria of Spizellomyces punctatus (Chytridiomycota).
86. CHARETTE, J.M. AND **GRAY, M.W.** (2003) **17th Annual Meeting, Program in Evolutionary Biology, Canadian Institute for Advanced Research**, White Point Beach, NS, Sept. 10-14.
Genes encoding U3 small nucleolar RNA are multi-copy and organized in a variety of contexts in Euglena gracilis.
87. WATKINS, R.F. AND **GRAY, M.W.** (2004) **NASA/CIAR Meeting on Lateral Gene Transfer and the Origins of Eukaryotes**, Harrison Hot Springs, BC.
Quantifying LGT frequency across a single eukaryotic phylum.
88. CHARETTE, J.M. AND **GRAY, M.W.** (2005) **Gordon Research Conference on RNA Editing**, Ventura, CA, Jan. 23-28.
Euglena gracilis U3 snoRNA genes are multi-copy and frequently linked to U5 snRNA genes.
89. BULLERWELL, C.E. AND **GRAY, M.W.** (2005) **Gordon Research Conference on RNA Editing**, Ventura, CA, Jan. 23-28.
tRNA editing in the mitochondria of a chytridiomycete fungus.
90. LOHAN, A.J. AND **GRAY, M.W.** (2005) **Gordon Research Conference on RNA Editing**, Ventura, CA, Jan. 23-28.
Purification status of Acanthamoeba castellanii mitochondrial tRNA editing activity.
91. LOHAN, A.J., SCHINDEL, E.T. AND **GRAY, M.W.** (2005) **Gordon Research Conference on RNA Editing**, Ventura, CA, Jan. 23-28.
Confirmation of 5'-terminal tRNA editing in the mitochondria of Polysphondylium pallidum.

92. SHUTT, T.E., RUSSELL, A.G., WATKINS, R.F. AND **GRAY, M.W.** (2005) **International Conference on Microbial Genomes**, Halifax, NS, Apr. 13-16.
An ancient intron and laterally transferred genes specifically unite three eukaryotic supergroups.
93. WATKINS, R.F. AND **GRAY, M.W.** (2005) **International Conference on Microbial Genomes**, Halifax, NS, Apr. 13-16.
Quantifying lateral gene transfer frequency across a single phylum.
94. PHILIPPE, H., BRINKMANN, H., RODRIGUEZ-EZPELETA, N., **GRAY, M.W.**, DERELLE, E., DELSUC, F. AND DOUZERY, E.J.P. (2005) **19th Annual Meeting, Program in Evolutionary Biology, Canadian Institute for Advanced Research**, Tigh-Na-Mara Resort, Parksville, BC, Sept. 15-19.
A new timescale for the evolution of eukaryotes inferred from a taxon-rich genome-scale dataset.
95. SHUTT, T.E. AND **GRAY, M.W.** (2005) **19th Annual Meeting, Program in Evolutionary Biology, Canadian Institute for Advanced Research**, Tigh-Na-Mara Resort, Parksville, BC, Sept. 15-19.
Twinkle, the mitochondrial replicative DNA helicase, is widespread in the eukaryotic radiation and may also be the mitochondrial primase in most eukaryotes.
96. SMITH, D.G.S., SPENCER, D.F., **GRAY, M.W.**, PEARLMAN, R.E. AND SIU, K.W.M. (2006) **54th ASMS Conference on Mass Spectrometry**, Washington State Convention Center, Seattle, WA, May 28-June 1.
Studies on the mitochondrial proteome of Tetrahymena thermophila using LC/LC-MS/MS.
97. GAWRYLUK, R.M.R., SMITH, D.G.S., SPENCER, D.F., PEARLMAN, R.E., SIU, K.W.M. AND **GRAY, M.W.** (2007) **FEBS Advanced Lecture Series, Mitochondria in Life, Death and Disease**, Aussois, France, April 25-29.
The mitochondrial energy cycle of the ciliate protozoon, Tetrahymena thermophila.
98. GAWRYLUK, R.M.R., SPENCER, D.F., SMITH, D.G.S., PEARLMAN, R.E., SIU, K.W.M. AND **GRAY, M.W.** (2007) **FEBS Advanced Lecture Series, Mitochondria in Life, Death and Disease**, Aussois, France, April 25-29.
An analysis of mitochondrial protein targeting and import in the ciliate protozoon, Tetrahymena thermophila.
99. GAWRYLUK, R.M.R., SMITH, D.G.S., SPENCER, D.F., PEARLMAN, R.E., SIU, K.W.M. AND **GRAY, M.W.** (2007) **Annual Meeting of the Society for Molecular Biology and Evolution (SMBE07)**, Dalhousie University, Halifax, NS, June 24-28.
The mitochondrial energy cycle of the ciliate protozoon, Tetrahymena thermophila.
100. ARCHIBALD, J.M., **GRAY, M.W.**, KEELING, P.J., MCFADDEN, G.I. AND LANE, C.E. (2007). **Second Annual DOE Joint Genome Institute User Meeting**, Walnut Creek, CA, March 28-30.
Impact of secondary endosymbiosis on genome evolution and cell biology: A cryptomonad and a chlorarachniophyte nuclear genome.

101. **GAWRYLUK, R.M.R.**, SPENCER, D.F. AND GRAY, M.W. (2009) **Joint Symposium of German Academy of Sciences Leopoldina, SFB 429 and SFB-TR1, *Molecular Genetics of Chloroplasts and Mitochondria***, Free University of Berlin, Berlin, Germany, September 20-23.
A proteomic investigation of the electron transport chain of Acanthamoeba castellanii mitochondria