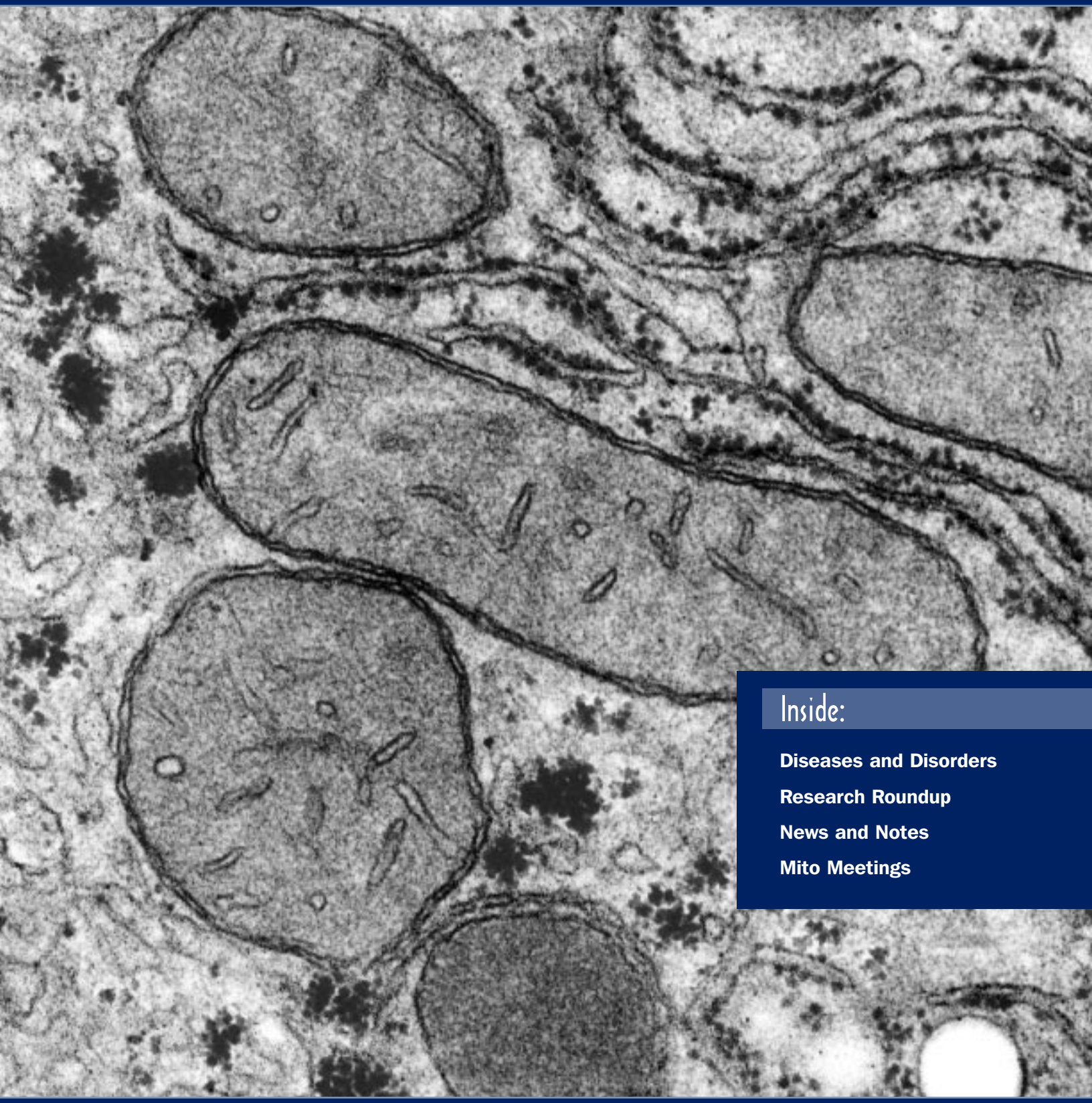
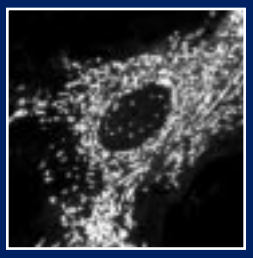
MitoMatters

The Official Newsletter of the Mitochondria Research Society



Inside:

Volume 2, Issue 1, 2003



Dear Member:

In our last issue we asked you to vote for the president and secretary to lead MRS into 2003. We received numerous ballots and the votes were quite close, demonstrating your strong support. It is an honor to announce the results of our election: our new president will be Dr. Kendall Wallace who is at the University of Minnesota, and our new secretary-treasurer is Dr. Deborah Murdock at Vanderbilt University. Their terms run from January 1 through December 31, 2003. The Executive Board welcomes and looks forward to working with Dr. Wallace and Dr. Murdock.

Our current efforts are focused on organizing and planning the upcoming 2004 meeting in Pittsburgh. We would appreciate your suggestions for topics, speakers, and funding resources. Please e-mail your ideas to gerschen@hawaii.edu.

With this newsletter you will find the membership application/ renewal form. If you have not already renewed your membership, please do so as soon as possible. With your renewal you will continue to receive an uninterrupted subscription to the *Mitochondrion Journal* and this newsletter, as well as other membership benefits.

If you have not done so already, please register at our web site (www.mitoresearch.org).

Soon we intend to distribute this newsletter electronically only. So if you do not register now you may not receive future newsletters.

Aloha,

Mariana Gerschenson, Ph.D.
Chair, Nominating Committee

Front cover image provided by Dennis Kunkel Microscopy Inc.

Published by the
Mitochondria Research Society
Post Office Box 306
Riderwood. MD, USA 21139-306

ISSN 1542-5355
MitoMatters, Vol. 2, Issue 1, 2003

Human Mitochondrial Protein Database

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The Human Mitochondrial Protein Database (HMPDb) provides comprehensive data on mitochondrial and human nuclear encoded proteins involved in mitochondrial biogenesis and function. This database consolidates information from SwissProt (http://www.ebi.ac.uk/swissprot), LocusLink (http://www.ncbi.nlm.nih.gov/LocusLink), the Protein Data Bank (PDB; http://nist.rcsb.org/pdb), GenBank (http://www.ncbi.nlm.nih.gov), the Genome Database (GDB; http://www.gdb.org), Online Mendelian Inheritance in Man (OMIM; http://www.ncbi.nlm.nih.gov/omim), Human Mitochondrial Genome Database (mtDB; http://www.genpat.uu.se/mtDB), MITOMAP (http://www.mitomap.org), Neuromuscular Disease Center (http://www.neuro.wustl.edu/neuromuscular/mitosyn.html) and Mendelian Inheritance and the Mitochondrion (MitoDat: http://srdata.nist.gov/mitdb). The mitochondrion plays a central role in cellular metabolism, and evidence of mitochondrial involvement in a number of different human diseases is increasing. This database is intended as a tool not only to aid in studying the mitochondrion but in studying the associated diseases.

FEATURES OF HMP DATABASE

Database Search: A customizable interface was developed to permit complex queries that include the name of the protein, tissue, mitochondrial compartment, chromosome number, molecular weight range, pI range, and keywords. Users can also restrict the data being searched to 2D-PAGE images, Locus links, the Genome Database, OMIM, or RefSeq information. The query results, along with the protein sequence and journal reference(s), are presented as an easy-to-read HTML page. The protein sequence is highlighted by using a mouse-over option that provides annotation such as the mitochondrion localization signal, variant information, etc. A selected protein sequence of interest can be used to search directly the SwissProt site for related proteins.

Mitochondrial DNA Sequence: A graphical tool was developed to visualize the human mitochondrial DNA sequences that highlight coding regions for RNAs and proteins. Disease-susceptible mutations are also noted in the sequence.

Mitochondrial DNA Polymorphism: Human mitochondrial sequences of different ethnic groups were obtained from the Human Mitochondrial Genome Database (mtDB; http://www.genpat.uu.se/mtDB). A DNA sequence analysis tool was developed to compare polymorphisms of different human mitochondrial DNA sequences. This tool allows the user to select mitochondrial sequences from any two human populations and compare them for sequence variations.

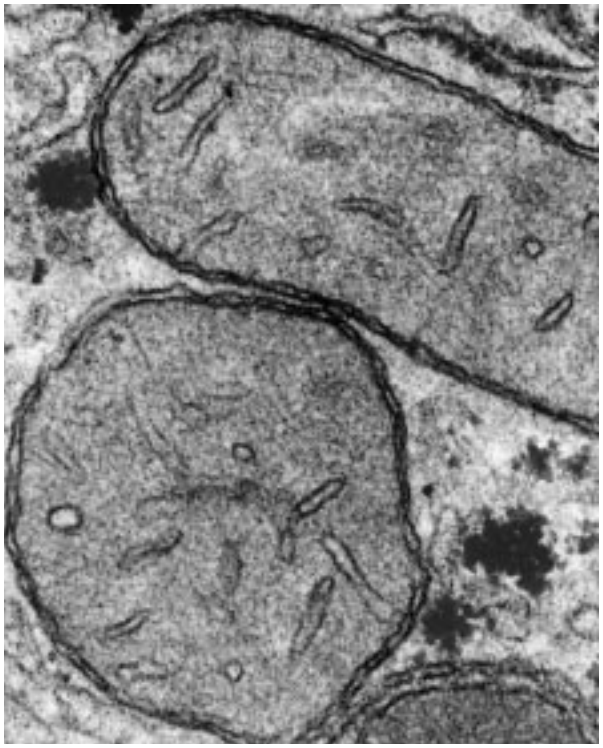
Mitochondrial Protein–Related Diseases: Malfunction of mitochondrial proteins affects many cells from brain, heart, liver, skeletal muscles, kidney, and the endocrine and respiratory systems. Relevant information for mitochondrial-related diseases from OMIM, the Neuromuscular Disease Center, and MITOMAP are gathered, and mitochondrion-associated diseases are grouped, categorized, and linked to OMIM.

3-D Structures of Mitochondrial Proteins: The available 3-D structures for mitochondrial proteins are presented through a custom-made interface. A concise HTML page is generated for reporting the structural details and the associated information obtained from the following web sites:

- PDBREPORT (http://www.cmbi.kun.nl/cgi-bin)

- Interatomic Contacts of Structural Units (CSU; http://bioinfo.weizmann.ac.il:8500/oca-bin)
- PROCHECK (http://www.biochem.ucl.ac.uk/bsm/pdbsum)
- Ligand Protein Contacts (LPC; http://bioinfo.weizmann.ac.il:8500/oca-bin)
- PROMOTIF (http://www.biochem.ucl.ac.uk/bsm/pdbsum)
- CastP (http://cast.engr.uic.edu/cast/calculation)
- References are linked to the PubMed (http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?db=PubMed).
- The 3-D structures are presented through the use of a Kinemage (http://kinemage.biochem.duke.edu).
- Links to other web sites relevant to mitochondrial proteins are provided. HMPDb is in beta-testing, and the production site will be available soon. HMPDb is available at: http://bioinfo.nist.gov:8080/examples/servlets/index.html.

Contact: MitoDb@nist.gov



Research Roundup

The Mito Databases

The journal *Nucleic Acids Research* has just published its 2003 database issue, completely dedicated to factual biological databases. Such databases are an essential resource for biologists. This compilation provides descriptions of a number of databases and introduces newly compiled databases that provide specialist information in the biological area. Of particular interest to those working in the field of mitochondria are the MPIMP, a database for the protein import machinery in plants, and the MitoDrome, a database for nuclear proteins targeted to mitochondria in Drosophila.

1. Lister R, Murcha MW & Whelan J. The Mitochondrial Protein Import Machinery of Plants (MPIMP) database. *Nucleic Acids Res.*, 31(1): 325–7, 2003.
2. Sardiello M, Licciulli F, Catalano D, Attimonelli M & Caggese C. MitoDrome: A database of Drosophila melanogaster nuclear genes encoding proteins targeted to the mitochondria. *Nucleic Acids Res.*, 31(1): 322–4, 2003.

Mitochondria and Aging: New Evidence

A relationship between mitochondrial dysfunction and aging has long been suggested; however, little direct experimental evidence for such correlation exists, especially in humans. Niemi and colleagues have recently demonstrated a strong correlation between certain mtDNA haplogroups and haplogroup clusters and longevity. Their results suggest the existence of advantageous mtDNA polymorphisms and support a role for mitochondria in determining longevity in humans.

1. Niemi AK, Hervonen A, Hurme M, Karhunen PJ, Jylha M & Majamaa K. Mitochondrial DNA polymorphisms associated with longevity in a Finnish population. *Hum. Genet*, 112(1):29–33, 2003.

Mitochondrial Gene Therapy

Mitochondrial diseases are usually difficult to treat with no real "cure" of the pathology. However, the use of gene therapy presents one attractive alternative. Leber hereditary optical neuropathy (LHON) is caused by a G to A transition mutation in the ND4 subunit of complex IV. Guy and colleagues have recently rescued cybrid cell lines expressing this mutation by introducing the "corrected" gene into the nuclear DNA, via an adenovirus vector. The success of this gene therapy approach in cell lines suggests the possibility of applying this type of approach in humans for this and other mitochondrial diseases.

1. Guy J, Qi X, Pallotti F, Schon EA, Manfredi G, Carelli V, Martinuzzi A, Hauswirth WW, Lewin AS. Rescue of a mitochondrial deficiency causing Leber hereditary optic neuropathy. *Ann Neurol.*, 52(5):534–42.

News and Notes

Change of Address for Editorial Office of the Mitochondrion Journal

Effective April 1, 2003, the editorial office will move from Baltimore to Buffalo, N.Y. The new address for the journal is Keshav K. Singh, Ph.D., Editor-in-Chief, Mitochondrion Editorial Office, Department of Cancer Genetics, Roswell Park Cancer Institute, Cell and Virus Building Room 247, Elm and Carlton Street, Buffalo, NY 14263, USA. Phone: 716-845-8541; fax: 716-845-8449; e-mail: keshav.singh@roswellpark.org or mitochondrion@roswellpark.org. Please make a note of it.

Online Manuscript Submission to the Mitochondrion Journal

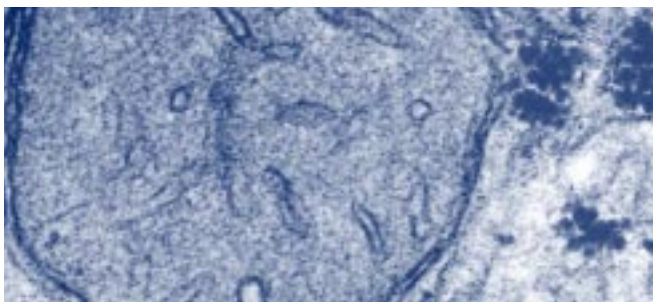
Mitochondria Research Society is working with Elsevier to develop an online submission tool for the *Mitochondrion Journal*. Soon manuscripts can be submitted to the journal using Elsevier's author gateway. Detailed information for online submission will be available on the MRS web site (www.mitoresearch.org) and the journal's site (www.elsevier.com/locate/mito).

Mito Meetings

Asian Society for Mitochondrial Research and Medicine meeting: First scientific meeting. Contact: Hong Kyu Lee, M.D. Department of Internal Medicine, Seoul National University College of Medicne, 28 Yongondong, Chongno-ku, Seoul, Korea. E-mail: hkleemd@plaza.snu.ac.kr; phone: 822-760-2266; fax: 822-765-7966. www.asmrm.org.

3rd European Metabolic Course: The Department of Metabolic and Endocrine Disorders and the Laboratory of Paediatrics and Neurology at the University Children's Hospital Nijmegen are organizing this meeting in collaboration with the Orphan Europe Academy on October 29–November 2, 2003.The course is designed for paediatricians with two to five years, clinical experience in the metabolic field. It is pitched at a high level and restricted to 33 participants. To receive the full program, please contact: Guilaine Arduin, Manager, Orphan Europe Academy, Orphan Europe Immeuble le Wilson—Cedex 70, 92046 Paris la Défense—France. E-mail: garduin@orphan-europe.fr; phone: 33.1.47.73.94.20; fax: 33.1.49.00.18.00.

6th Euromit meeting, June 30–July 4, 2004: Contact Jan Smeitink, M.D., Ph.D., Nijmegen Center for Mitochondrial Disorders, Department of Pediatrics, University Medical Center Nijmegen; Geert Grooteplein 10, PO BOX, 9101, 6500 HB Nijmegen, The Netherlands. E-mail j.smeitink@cukz.umcn.nl; phone: 0031-24-3614430; fax: 0031-24-3616428.



Elected Officers of the Mitochondria Research Society 2003

PLEASE WELCOME OUR NEWLY ELECTED LEADERS.

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President

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Secretary/Treasurer

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Their financial help is greatly appreciated.

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THE MITOCHONDRIA RESEARCH SOCIETY

P.O. Box 306, Riderwood, MD 21139, USA
Phone: 410-502-7303 Fax: 410-502-7244

MEMBERSHIP APPLICATION FORM

Membership benefits include:

1. Subscription to society journal *Mitochondrion*
2. Subscription to *MitoMatters* newsletter highlighting new products/tools relevant to mitochondria research and developments in research, prevention, diagnosis, and treatment of mitochondrial diseases
3. MRS member directory
4. Reduced rate of job posting at MRS web site
5. Reduced registration fee in national and international meetings and workshops organized by MRS

(Please type or print clearly)

❒ New member ❒ Membership renewal Date _____

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Organization _____

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Telephone _____ Fax_____ E-mail _____

Academic training: ❒ Ph.D. ❒ M.D. ❒ D.VM. ❒ Other:_____
Please specify

Primary field of interest:
❒ Biochemistry ❒ Evolution ❒ Molecular Biology
❒ Biophysics ❒ Forensics ❒ Pharmacology
❒ Cell Biology ❒ Genetics ❒ Toxicology ❒ Other: _____
Please specify

Current research: _____

_____

_____

Membership fee for MRS is $50. To join, please submit a personal check or money order drawn in U.S. dollars and made payable to The Mitochondria Research Society, or pay by credit card. If paying by credit card, please fill out the credit card details below:

❒ Visa ❒ MasterCard

Credit card number _____ Expiration date _____

Signature _____ Date _____

Send or fax application to: The Mitochondria Research Society, P.O. Box 306, Riderwood, MD, 21139-0306, USA; fax: 410-502-7244. Thank you.

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