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### **Principal Investigators**

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Ned Ballatori, Ph.D. Professor of Toxicology Department of Environmental Medicine University of Rochester School of Medicine

David W. Barnes, Ph.D. Investigator and Director Marine Cell Lines and Stem Cell Program Mount Desert Island Biological Laboratory

Christopher J. Bayne, Ph.D. Professor of Zoology Oregon State University, Corvallis

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## **High School Research Fellowship:**

Rebecca Barter, ME School of Science and Math James Dunleavey, Sumner Memorial High School Nathaniel Jillette, Lewiston High School Gina Luchini, Ellsworth High School Elizabeth Mitchell, ME School of Science and Math Sonal Patel, Chatham Hall Justin Pierre-Louis, HS for Math, Science, & Engineering Scott Trausch, Parkway Central High School Brendan Vosburgh, Amity Regional Senior HS

#### **Mentors:**

Carolyn Mattingly, Ph.D. Markus Frederich, Ph.D. Raymond Henry, Ph.D. Susan Edwards, Ph.D. Petra Lenz, Ph.D. J. Denry Sato, D. Phil. John N. Forrest, Jr., M.D. Leon Goldstein, Ph.D. J. Larry Renfro, Ph.D.

#### **NIEHS CMTS Community Environmental Health Laboratory:**

Jonathan Hollenbeck, MDI High School

#### **UNDERGRADUATE FELLOWSHIP RECIPIENTS**

#### NSF Research Experience for Undergraduates (REU):

Alisa Crawford-McKenzie, Medgar Evers College Makesha Foster, Georgia Southern University Emily Hand, University of Richmond Katherine Hessler, University of Chicago Jennifer Higgins, Middlebury College Joshua Jones, College of the Atlantic Zachary Karim, New Mexico Highlands University Rebecca Kreh, University of Florida Margaret Lowenstein, Williams College Delyn Martinez, New Mexico Highlands University Alexander Peters, Princeton University Ashley Wolf, Princeton University Jane Disney, Ph.D.

John N. Forrest, Jr., M.D. Ned Ballatori, Ph.D. Bruce Stanton, Ph.D. Franklin Epstein, M.D. Alice Villalobos, Ph.D. Jane Disney, Ph.D. Warren Hill, Ph.D. David Evans, Ph.D. Raymond Henry, Ph.D. Petra Lenz, Ph.D. John N. Forrest, Jr., M.D. Antonio Planchart, Ph.D.

# NIH/NCRR Maine IDeA Network of Biomedical Research Excellence (INBRE-ME):

Joseph Aman, University of Maine - Farmington Yu-Hwei Chou, Colby College Melissa Coito, Bates College Anne Czechanski, College of the Atlantic Jessica Deane, University of Maine Kristin Gabor, Maine Maritime Academy Justin Kievits, Bowdoin College Todd Kitchens, College of the Atlantic Diana Kombe, College of the Atlantic Laura Lalemand, University of Maine - Farmington Amanda McGarry, Colby College Innocent Ndzana, University of Maine - Machias Michaela O'Rourke, University of New England Alexandra Smith, Bowdoin College Hannah Tetreault, University of Maine - Machias Juan Vanegas, University of Maine

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# NSF Collaborative Research at the Undergraduate Institutions (CRUI):

Jamie Baldwin, Illinois State University Marianna Bradley, College of the Atlantic Jason Childers, College of the Atlantic Jason Crowner, Illinois State University Matthew DeBerge, Illinois State University Amy Flowers, Illinois State University Kevin Kocot, Illinois State University Bridget Lahey, Illinois State University Erica Maltz, College of the Atlantic Sean McBride, Illinois State University

#### **Stanley Bradley Fellowship:**

Catherine Kelley, Skidmore College

**Adrian Hogben Fellowship:** 

Renee Thibodeau, Whitman College

#### Stan and Judy Fellowship:

Will Motley, Middlebury College

#### **TEACHER FELLOWSHIP RECIPIENTS**

# NIEHS CMTS Community Environmental Health Laboratory

Bonnie Burne, Pemetic Elementary School Bob Chaplin, Conners-Emerson Elementary School Amy Palmer, Vinalhaven School Jennifer Shanholtzer, MDI High School

## **NSF Research Experience for Teachers**

Jennifer Shanholtzer, MDI High School

all students mentored by: George Kidder, Ph.D. Chris Peterson, Ph.D. Robert L. Preston, Ph.D.

John N. Forrest, Jr., M.D.

Bruce Stanton, Ph.D.

John N. Forrest, Jr., M.D.

Jane Disney, Ph.D.

Barbara Beltz, Ph.D.

# **NEW INVESTIGATOR AWARDS**

# Salisbury Cove Research Fund:

William Aird, M.D., Beth Israel Deaconess Medical Center
Christopher P. Cutler, Ph.D., Georgia Southern University
Susan L. Edwards, Ph.D., James Cook University, Australia
Markus Frederich. Ph.D., University of New England
Warren G. Hill, Ph.D., University of Pittsburgh
Shawn E. Holt, Ph.D., Medical College of Virginia, Virginia Commonwealth University
Joseph R. Shaw, Ph.D., Dartmouth College
Peter F. Straub, Ph.D., Richard Stockton College of New Jersey

## **MDIBL Named Fellowships:**

William Aird, M.D., Beth Israel Deaconess Medical Center, Dahlgren Fellowship
Barbara S. Beltz, Ph.D., Wellesley College, Maren Fellowship
Gary W. Conrad, Ph.D., Kansas State University, Forster Fellowship & F.H. Epstein Investigatorship
Susan L. Edwards, Ph.D., James Cook University, Australia, Schmidt-Nielsen Fellowship
Markus Frederich, Ph.D., University of New England, Blum-Halsey Fellowship
Griselda Genovese, Ph.D., Universidad de Buenos Aires, Schmidt-Nielsen Fellowship
Jeremy D. Long, Ph.D., Northeastern University, Maren Fellowship
Carlos Marcelo Luquet, Ph.D., CONICET, Argentina, Blum-Halsey Fellowship
Warren G. Hill, Ph.D., University of Pittsburgh, F.H. Epstein Investigatorship
David C. Sandeman, Ph.D., Wellesley College, Blum-Halsey Fellowship
Mario Schiffer, M.D., Hannover Medical School, Blum-Halsey Fellowship
Leonard I. Zon, M.D., Howard Hughes Medical Institute, Blum-Halsey Fellowship

# **MDIBL NIEHS Center for Membrane Toxicity Studies Fellowships:**

Barbara S. Beltz, Ph.D., Wellesley College
Shi-Ying, Cai, Ph.D., Yale University School of Medicine
Celia Y. Chen, Ph.D., Dartmouth College
H. Rex Gaskins, Ph.D., University of Illinois at Urbana-Champaign
Shawn E. Holt, Ph.D., Medical College of Virginia, Virginia Commonwealth University
David C. Sandeman, Ph.D., Wellesley College
Joseph R. Shaw, Ph.D., Dartmouth College
Peter F. Straub, Ph.D., Richard Stockton College of New Jersey

## NIH/NCRR Maine Biomedical Research Infrastructure Network Junior Faculty:

Ryan Bavis, Ph.D., Bate College Clare Bates Congdon, Colby College Joel Graber, Ph.D., The Jackson Laboratory Lynn Hannum, Colby College Hadley Horch, Ph.D., Bowdoin College Nancy Kleckner, Ph.D., Bates College Carolyn Mattingly, Ph.D., Mount Desert Island Biological Laboratory Antonio Planchart, Ph.D., College of the Atlantic/Mount Desert Island Biological Laboratory J. Denry Sato, D.Phil., Mount Desert Island Biological Laboratory Rebecca Sommer, Ph.D., Bates College Nicole Theodosiou, Ph.D., Bowdoin College Andrea Tilden, Colby College

# **2005 SEMINARS**

Seminars preceded by an asterisk were presented by investigators supported by the NIEHS Center for Membrane Toxicity Studies at the Mount Desert Island Biological Laboratory

# Morning Membrane Transport Seminars

July 11	"pH and osmoregulation in elasmobranchs: identification of cation and acid transporters in gills" Keith Choe, Ph.D., Postdoctoral Fellow, Department of Zoology, University of Florida
July 18	"New mechanisms of regulation for an old osmolyte transporter: The anion exchanger of the skate RBC" Leon Goldstein, Ph.D., Department of Molecular Pharmacology, Physiology & Biotechnology, Brown University
July 25	"Novel parathyroid hormone-like peptides and fish calcium/phosphate balance" <b>Pedro M. Guerreiro, Ph.D.,</b> Postdoctoral Research Fellow, Centre for Marine Sciences, University of Algarve, Portugal; Dept. of Physiology & Neurobiology, University of Connecticut
August l	"Acid-base regulation and Na <sup>+</sup> /H <sup>+</sup> exchange in fishes: NHE's here, there, everywhere?" J.B. Claiborne, Ph.D., Professor, Department of Biology, Georgia Southern University
August 8	"Calcium, superoxide and vascular smooth muscle" Susan K. Fellner, M.D., Research Professor, Department of Cell and Molecular Physiology, University of North Carolina, Chapel Hill
August 15	"The sodium-calcium exchanger: Structure and function" Lars Cleemann, Ph.D., Associate Professor of Pharmacology, Department of Physiology, Georgetown University
August 22	"Spatial and temporal dynamics of endothelium" William Aird, M.D., Associate Professor, Harvard Medical School, Beth Israel Deaconess Medical Center
Friday Noor	n Brown Bag Seminars
July 8	Introductory 5 minute talks by MDIBL Principal Investigators to summarize summer research projects
July 15	Introductory 5 minute talks by MDIBL Principal Investigators to summarize summer research projects
July 22	Introductory 5 minute talks by MDIBL Principal Investigators to summarize summer research projects
July 29	Bruce MacIver, Ph.D., Research Asst. Professor, Renal Electrolyte Division, Department of Medicine, University of Pittsburgh,

\*Alice Villalobos, Ph.D., Assistant Professor, Department of Environmental Medicine, University of Rochester

- August 5 Mario Schiffer, M.D., Fellow, Internal Medicine; Nephrology/Researcher, Hannover Medical School, Germany
- August 12 Introductory 5 minute talks by MDIBL Principal Investigators to summarize summer research projects

#### Wednesday Evening Public Seminars

- \*June 29 THE ELEVENTH HELEN F. CSERR MEMORIAL LECTURE "Creating a view of the sensory world: how interneurons encode sensory signals in the environment" **Gwen A. Jacobs, Ph.D.**, Professor of Neuroscience; Department Head, Cell Biology & Neuroscience, Montana State University, Bozeman
- \*July 6"An economically feasible sea water agriculture that can relieve regional poverty and hunger in desert countries" **Gordon Sato, Ph.D.**, *Manzanar Project* and recipient of the 2005 Blue Planet Prize - the international prize for outstanding achievement in scientific research on global environmental problems.
- \*July 13 THE TWENTY-THIRD WILLIAM B. KINTER MEMORIAL LECTURESHIP "Master control genes and development" Francis Ruddle, Ph.D., Professor Emeritus, Molecular, Cellular and Developmental Biology, Yale University School of Medicine
- \*July 20 "Arsenic: The King of Poisons" **Bruce A. Stanton, Ph.D.**, Professor, Department of Physiology, Dartmouth Medical School
- July 26
   THE FIFTEENTH ANNUAL THOMAS H. MAREN MEMORIAL SEMINAR
   (Tuesday)
   "Hypoxic Kidneys and Lungs: Lessons and Questions from on High (Altitude)"
   Erik Swenson, M.D., Professor, Pulmonary/Critical Care Medicine, VA Puget
   Sound Health Care System, University of Washington
- August 10 THE TENTH LEONARD SILK MEMORIAL LECTURE "Benjamin Franklin and His Scientist Friends" Claude-Ann Lopez, Ph.D., Consulting Editor, Yale University Press
- August 17"A New Model for the Control of Prostaglandin Signalling" Victor L. Schuster,<br/>M.D., Chairman, Department of Medicine at Albert Einstein College of Medicine

#### **Special Seminars and Presentations**

 \*May 9 Meeting of the Center for Marine Functional Genomics Studies - "Disease impacts on Southern New England Lobsters: Could the Gulf of Maine be next?" Richard Wahle, Ph.D., Senior Research Scientist, Bigelow Laboratory for Ocean Sciences

- \*July 28 "IDeA and the roadmap ahead for clinical and translational science" **Barbara Alving, M.D.**, Acting Director, National Center for Research Resources (presented at the MDIBL Annual Meeting of the Corporation)
- August 15 "George B. Dorr and the Early Development of MDI Scientific and Cultural Institutions" Franklin H. Epstein, M.D., William Applebaum Professor of Medicine, Beth Israel Deaconess Medical Center; Harvard Medical School and Ronald H. Epp, Ph.D., Associate Professor of Philosophy; Director, Shapiro Library, Southern New Hampshire University
- August 19 THE JESSICA H. LEWIS NATURAL SCIENCES LECTURE Brian G. Marsden, Ph.D., Astronomer at the Harvard-Smithsonian Astrophysical Observatory, Cambridge, MA

# 2005 CONFERENCES, SYMPOSIA AND WORKSHOPS

- \*April 28 Center for Marine Functional Genomics Studies Informal sessions on issues relating to future directions for the Center, including problems, opportunities and technology assessment in gene sequencing, microarrays, toxicology and stress responses in aquatic organisms. David Barnes, Ph.D., Director, Marine Cell Lines & Stem Cell Program and Research Scientist, MDIBL; George Iwama, Ph.D., Dean of Science at Acadia University, Nova Scotia; Christopher J. Bayne, Ph.D., Professor Emeritus, Department of Zoology, Oregon State University at Corvallis; H. Rex Gaskins, Ph.D., Professor of Immunobiology, Departments of Animal Sciences & Veterinary Pathobiology, Inst. for Genomic Biology, Univ. of Illinois at Urbana-Champaign; Peter F. Straub, Ph.D., Associate Professor, Biology Program, Richard Stockton College of New Jersey
- April 29-3032nd Maine Biological and Medical Sciences Symposium (MBMSS)<br/>co-hosted by The Mount Desert Island Biological Laboratory and The Jackson<br/>Laboratory with support from the Maine Biological Research Infrastructure<br/>Network NCRR NIH

#### Friday, April 29

Symposium welcome and introduction: Patricia Hand, Ph.D., Administrative Director, MDI Biological Laboratory

\*"The cellular stress response and life in the intertidal zone: a tale of two sculpins" <u>Keynote</u> <u>Speaker</u>: George Iwama, Ph.D., Dean of Science, Professor of Biology, Acadia University, Wolfville, Nova Scotia

SESSION I: Genetics and Genomics (Mary Ann Handel, Ph.D., Chair)

\*"Gene transcription in livers of rainbow trout induced by bacterin: fundamental innate immune defenses" Christopher Bayne, Ph.D., Professor of Zoology, Center for Gene Research and

Biotechnology, Oregon State University, MDI Biological Laboratory

"Mechanisms of NOTCH induced proliferation in vascular smooth muscle cells" Matthew Havrda, Graduate Student, Maine Medical Center Research Institute

"The transcriptional repressor Snail is required for left-right asymmetry determination in the mouse" Steve Murray, Ph.D., Postdoctoral fellow, The Jackson Laboratory

"GAPHYL: A genetics algorithms search for phylogenies" Clare Bates Congdon, Ph.D., Assistant Professor of Computer Science, Colby College

"Evidence of a large-scale functional organization of mammalian chromosomes" **Petko Petkov**, **Ph.D.**, Associate Research Scientist, The Jackson Laboratory

"Unique differences in important TRIF structural motifs may have broad implications for tolllike receptor signaling in the zebrafish" **Con Sullivan**, Graduate Student, Dept. of Biochemistry, Microbiology and Molecular Biology, The University of Maine

"TWIST dimer selection regulates cranial suture paterning and fusion" **Doug Spicer**, Ph.D., Investigator, Maine Medical Center Research Institute

"Comparative analysis of polyadenylation signals from a diverse group of organisms" Jesse Salisbury, Graduate Student in Functional Genomics, The University of Maine and The Jackson Laboratory

"In drosophilo: Using Drosophila to identify mouse homologs involved in oogenesis and early development" Anne Czechanski, Undergraduate Student, College of the Atlantic

SESSION IIA: Marine and Field Research (Nicole Theodosiou, Ph.D., Chair)

"Turbulent Seas in the Wake of Cod: Accelerating Booms and Busts in Maine's Coastal Zone" **Robert Steneck, Ph.D.**, Professor, School of Marine Sciences, Darling Marine Center, The University of Maine

"Invasive species as a new food source: Does a local predator prefer eating a non-native bryozoan?" Marney Pratt, Ph.D., Visiting Assistant Professor, Bowdoin College

"Activation of 5'-AMP activated protein kinase during anaerobiosis in the rock crab, *Cancer irroratus*" Markus Frederich, Ph.D., Assistant Professor of Biological Sciences, University of New England

"Evolution and patterning of the intestine in *Leucoraja erinacea*" Daniel Hall. Undergraduate Student, Bowdoin College

"DNA vaccine against infectious pancreatic necrosis virus" Sally Molloy, Graduate Student, Dept. of Biochemistry, Microbiology and Molecular Biology, The University of Maine

"Title TBA" Charles O'Kelly, Ph.D., Senior Research Scientist, Bigelow Marine Laboratory

"New small animal magnetic resonance imaging facility at Maine Medical Center Research Institute" Ilka Pinz, Ph.D., Staff Scientist, Maine Medical Center Research Institute

**POSTER SESSION** - Dahlgren Hall

Saturday, April 30 SESSION IIB: Marine and Field Research (Steve Katona, Ph.D., Chair)

\*"*Ciona intestinalis* and its microbiota as a model for comparative toxicogenomics" **H. Rex Gaskins, Ph.D.**, Professor of Immunobiology, University of Illinois Urbana-Champaign and MDI Biological Laboratory

"Molecular analysis of coyotes from Maine: Evidence for hybridization with wolves?" Ashley Choiniere, Undergraduate Student, University of Maine - Machias

SESSION III: Research of the Maine INBRE (David Barnes, Ph.D., Chair)

\*"Cross-species comparative studies of ABC genes" Carolyn Mattingly, Ph.D., Director, Bioinformatics Core, MDI Biological Laboratory

"Patterns of Respiratory Burst Activity in Zebrafish" Lynn Hannum, Ph.D., Assistant Professor of Biology, Colby College

SESSION IV: Workshop (Charlie Slavin, Ph.D., Moderator) Biological and Biomedical Graduate Programs in Maine John Anderson, Ph.D., College of the Atlantic, Masters in Human Ecology

Keith Hutchison, Ph.D., U Maine and The Jackson Laboratory Ph.D. Program in Functional Genomics; U Maine Graduate School of Biomedical Sciences; U Maine IGERT Program Sensor Science, Engineering, and Informatics

Lawrence Fritz, Ph.D., MS in Marine Biology and Medical Biotechnology, University of New England

Stephen Pelsue, Ph.D., Univ. Southern Maine Graduate Program in Applied Immunology and Molecular Biology

Charlie Slavin, Ph.D., Building Your Application for Graduate School

SESSION V: Environmental Health (T. Glen Lawson, Ph.D., Chair)

\*"Genomic biomarkers of environmental degradation in marine fishes: models for human health risks" **Peter Straub, Ph.D.**, Associate Professor of Biology, Richard Stockton College of New Jersey and MDI Biological Laboratory

"Picornavirus 3C proteases are targeted by multiple ubiquitin-conjugating pathways" **T. Glen** Lawson, Ph.D., Professor of Chemistry, Bates College

"Collagen triple helix repeats containing 1, a novel secreted protein in injured and diseased arteries inhibits collagen expression and promotes cell migration" **Petr Pyagay, M.D.**, Postdoctoral Fellow, Maine Medical Center Research Institute

\*"Genomic effects of marine brevetoxins" Greg Mayer, Ph.D., Assistant Professor, Dept. of Biochemistry, Microbiology, and Molecular Biology, The University of Maine

\*"Air quality in Maine lobster shacks: Health effects and intervention" Ann Backus, M.S., Director of Outreach, Occupational Health Program, Harvard School of Public Health

\*"Putative dioxin response elements (DREs) upstream of beta-adrenergic receptor genes" **Rebecca Sommer, Ph.D.**, Assistant Professor, Dept. of Environmental Studies, Bates College

- \*May 9 Center for Marine Functional Genomics Studies "Disease impacts on Southern New England Lobsters: Could the Gulf of Maine be next?" Richard Wahle, Ph.D., Senior Research Scientist, Bigelow Laboratory for Ocean Sciences
- \*June 8 Bioinformatics Workshop NCBI Field Guide to GenBank and NCBI Molecular Biology Resources - lecture and hands-on computer workshop on GenBank and related databases covering effective use of the Entrez databases and search service, the BLAST similarity search engine, genome data and related resources
- \*June 17-18 Satellite Workshop to the Gordon Conference on Mycotoxins and Phycotoxins: Application of Emerging Technologies to Mycotoxin and Phycotoxin Research

#### Friday, June 17

Workshop welcome and introduction: Ken Voss, Ph.D., US Department of Agriculture and Kathleen Rein, Ph.D., Florida International University

"Rapid methods in the analysis of mycotoxins" Michael Zheng, Ph.D., Director, Romer Labs

"New developments in analytical methods for phycotoxins and international validation efforts" James Hugerford, Ph.D., Research Chemist, US Food and Drug Administration

"Diving into the fungal proteome: proteomics for the study of mycotoxins" Scott Baker, Ph.D., Senior Research Scientist, Pacific Northwest National Laboratory

"Single-tube detection of multiple harmful algal species by quantitative real-time PCR" Kathryn Coyne, Ph.D., Research Scientist, University of Delaware

"Multiplex protein profiling with the Luminex xMAP system" Jim Jacobson, Ph.D., Vice President of Research and Development, Luminex Corporation

"A multilocus genotypying array for identification of *Fusarium* Head Blight species and chemotypes" **David Starkey, Ph.D.**, USDA Agricultural Research Service

Hands-on Demonstrations by Cepheid; Flow Cam (Mike Sieracki); DakoCytomation; Nomadics; Surface Plasmon Resonance (Tim Chinowski); Luminex; Romer Laboratories.

## Saturday, June 18

"Surface plasmon resonance: in the field or in the lab?" Anna Tudos, Ph.D., University of Twente

"Portable surface plasmon resonance instrumentation for rapid, versatile biodetection" Tim Chinowsky, Ph.D., University of Washington

"Biotoxin profiling small samples: nano liquid chromatography with multiple mass spectrometry for the determination of polyether toxins" **Kevin James, Ph.D.**, Director of Research, Cork Institute of Technology

"The multistep-step process for multiple mycotoxins detection" Darsa Siantar, Ph.D., Senior Chemist, Alcohol and Tobacco Tax and Trade Bureau

"Detection of harmful algal cells by an imaging-in-flow system (FlowCAM)" Mike Sieracki, Ph.D., Senior Research Scientist, Bigelow Laboratory for Ocean Sciences

"Integration of flow cytometry, cell sorting and molecular approaches for the study of toxic algae" Chris Sinigalliano, Ph.D., Assistant Research Scientist, Florida International University

\*July 13-14 Twelfth Annual Mount Desert Island Biological Laboratory (MDIBL) Environmental Health Sciences Symposium - Sponsored by the National Institute of Environmental Health Sciences (NIEHS) MFBS Center at the MDIBL, the National Center for Research Resources, the Yale University Liver Center, the Kinter Memorial Lectureship Fund, and the MDIBL

"Molecular Evolution of Chemical Defense Mechanisms"

## Wednesday Evening, July 13, 2005

23<sup>rd</sup> Annual William B. Kinter Memorial Lecture: "Master Control Genes and Development" Keynote speaker, Frank H. Ruddle, Ph.D., Professor Emeritus, Molecular, Cellular and Developmental Biology, Yale University School of Medicine

POSTER SESSION - Dahlgren Hall

<u>Thursday, July 14</u> Welcome, John N. Forrest, Jr., M.D., Director, MDIBL; Yale University School of Medicine

**SESSION I:** Genomic Adaptations to Toxic Chemicals

"Stress-directed adaptive mutations and evolution" Barbara E. Wright, Ph.D., University of Montana

"Genomic biodiversity, phylogenetics and coevolution in proteins" **David D. Pollock, Ph.D.**, Louisiana State University

SESSION II: Evolution of Drug-Metabolizing Enzymes

"Evolution of drug metabolism" Daniel W. Nebert, M.D., University of Cincinnati

"Comparative analysis of CYP P450 enzymes" Mary A. Schuler, Ph.D., University of Illinois, Urbana

"The evolution of cytochrome p450 in animals" David R. Nelson, Ph.D., University of Tennessee

"Mechanistic imperatives for the evolution of glutathione S-transferases" Richard N. Armstrong, Ph.D., Vanderbilt University School of Medicine

**SESSION III:** Evolution of Xenobiotic Transporters

"Transport protein evolution" Milton H. Saier, Jr., Ph.D., University of California at San Diego

"Whole genome analysis of xenobiotic transport genes" Ian T. Paulsen, Ph.D., TIGRE

"Towards an understanding of the substrate specificity of the human ABC transporter, MRP1 (ABCC1)" Susan P.C. Cole, Ph.D., Queen's University

"The role of Mrp3 in handling of xenobiotics" Ronald Oude Elferink, Ph.D., Academic Medical Center, Amsterdam

"Development of hepatic drug transporters" James L. Boyer, M.D., Center Director; Yale University School of Medicine

# August 2 INBRE Student Symposium

Welcome and introduction to the symposium: **Patricia Hand, Ph.D.**, Principal Investigator, Maine INBRE and **Michael McKernan**, Co-Director, Outreach Core, Maine INBRE

\*"Detoxification genes in Ciona intestinalis" Joseph Aman, University of Maine – Farmington

"Pbx1 and its role in spleen development in the chick" Alexandra Smith, Bowdoin College

"Promoting the culture of male germ cells in vitro" Jessica Deane, The University of Maine

"Characterization of Serac1 expression in the spiny dogfish" Todd Kitchens, College of the Atlantic

"Identifying novel genes regulating plasma high-density lipoprotein cholesterol levels" Yu-Hwei Chou, Colby College

"Mapping the potential QTLs that protect the heart from DCM in 'buff' Nmd mice" Innocent Ndzana, University of Maine – Machias

Five-Minute Talks by:

Melissa Coito, Bates College Anne Czechanski, College of the Atlantic Kristen Gabor, Maine Maritime Academy Justin Kievits, Bowdoin College Diana Kombe, College of the Atlantic Laura Lalemand, University of Maine – Machias Amanda McGarry, Colby College Michaela O'Rourke, University of New England Hannah Tetreault, University of Maine – Machias Juan Vanegas, The University of Maine

### August 4 2005 MDIBL Student Symposium

Welcome and Introduction, Michael McKernan, Director of Education, MDI Biological Laboratory

"Characterizing the TASK-1 K<sup>+</sup> Channel in Shark Rectal Gland" Nora Beltz, Wellesley Collge, Alisa Crawford-McKenzie, Medgar Evers College (REU), Alex Peters, Princeton University (REU), and Justin Pierre-Louis, The High School for Math, Science, and Technology at the City College (HS)

\*"Effects of arsenic on CFTR in *Fundulus heteroclitus*" **Emily Hand**, University of Richmond (REU) and **Kristin Gabor**, Maine Maritime Academy (REU/INBRE)

\*"The effect of tmao on hsp70 induction in dogfish choroid plexus" Jennifer Higgins, Middlebury College (REU)

"A genetic algorithms approach to inferring conserved sequences" Charles Fizer, Colby College (INBRE) and Noah Smith, Colby College (INBRE)

\*"Investigation of seal harbor beach pollution sources" Joshua Jones, College of the Atlantic (REU) and Jonathan Hollenbeck, MDI High School (CMTS)

"Escape behaviors in developmental stages of the calanoid copepod species, Calanus finmarchicus" **Delyn Martinez**, New Mexico Highlands University (REU)

"Lunar effects on neurogenesis and locomotion in *carcinus maenas*" Jennifer Shanholtzer, MDI High School (RET)

"Down-regulation of carbonic anhydrase activity and expression in the gills of the euryhaline crab, *carcinus maenas*" Margaret Lowenstein, Williams College (REU)

"Site-directed mutagenesis of a killifish kinase" **Pearl Ryder**, The University of Chicago and **Sonal Patel**, Chatham Hall (HS)

\*August 12 Mini Symposium (1:00-5:00 pm) - Arsenic and ABC Transporters to share new data and ideas, and to foster collaborations among investigators working on arsenic at the MDIBL and other institutions in Maine

"Arsenic Overview: Arsenic inhibits CFTR-mediated Cl secretion in killifish operculum" **Bruce Stanton**, **Ph.D.**, Professor, Department of Physiology, Dartmouth Medical School

"Arsenic disrupts cortisol-GR-stimulation of CFTR gene expression" Joseph Shaw, Ph.D., Research Associate, Department of Biology, Dartmouth College "Arsenic inhibits CFTR-mediated Cl secretion in SG" John N. Forrest, Jr., M.D., Director, MDIBL; Professor of Medicine, Department of Internal Medicine, Division of Nephrology, Yale University School of Medicine

"Arsenic effects on hCFTR in Xenopus oocytes" **Raymond A. Frizzell, Ph.D.**, Professor and Chairman, Department of Cell Biology and Physiology, School of Medicine, University of Pittsburgh

"Arsenic, CFTR and innate immunity in Zebrafish" **Carol H. Kim, Ph.D.**, Associate Professor, Department of Biochemistry, Microbiology, and Molecular Biology, The University of Maine

"Arsenic and SGK" **Denry Sato, Ph.D.**, Deputy Director of the Marine Cell Line and Stem Cell Program, Mount Desert Island Biological Laboratory

"Arsenic enhances MRP2 substrate transport in killifish proximal tubule" **David S. Miller**, **Ph.D.**, Senior Investigator, Laboratory of Pharmacology and Chemistry, NIH/NIEHS

"Arsenic enhances MRP2 gene expression" Joseph Shaw Ph.D., Research Associate, Department of Biology, Dartmouth College

*August 12-14	Mount Desert Island Stem Cell Symposium
	Co-hosted by The Mount Desert Island Biological Laboratory and
	The Jackson Laboratory with support from The National Institute for
	Diabetes & Digestive & Kidney Diseases, The National Institute of Child
	Health and Human Development, The National Institute of Environmental
	Health Sciences, The National Institute of Deafness and other
	Communication Disorders

Friday, August 12

**SESSION I:** Workshop: Current topics in fish development and stem cell research\* (Leonard Zon, MD, Chair) \*This workshop will focus on many topics from fish technology development, comparative genomics, transplantation, genetics, and biology. Talks do not necessarily relate directly to stem cells.

Welcome and Introduction to the Workshop, Leonard Zon, M.D.

"Fishing for Functional DNA: Efficient Analysis of Conserved Regulatory Elements in Transgenic Zebrafish" Shannon Fisher, Ph.D., Johns Hopkins University School of Medicine

"Discovering Chemical Modifiers of Cell Specification and Differentiation" Randall Peterson, Ph.D., Massachusetts General Hospital

"Glia Inhibit Proliferation of Sensory Organ Precursors in the Zebrafish Lateral Line" Tatjana Piotrowski, Ph.D., University of Utah

"Origin and Differentiation of Myocardial Cells During Zebrafish Heart Regeneration" Ken Poss, Ph.D., Duke University

"Genetic Dissection of Glial Development and Myelination in Zebrafish" Will Talbot, Ph.D., Stanford University School of Medicine

"Modeling Kidney Disease and Regeneration with Zebrafish Pronephros" Iain Drummond, Ph.D., Massachusetts General Hospital

"The Role of Notch Signaling in Patterning Zebrafish Neurogenesis" Ajay Chitnis, Ph.D., NICHD/NIH

SESSION II: Advances in Mammalian Stem Cell Research (John N. Forrest, Jr., MD, Chair)

Welcome and Introduction to the Symposium, John N. Forrest, Jr., M.D., Director, MDI Biological Laboratory

"Directing the Fate of ES Cells" George Daley, M.D., Ph.D., Harvard Medical School

"Neuronal Subtype Specification from Primate Embryonic Stem Cells" Leonard Shultz, Ph.D., The Jackson Laboratory, Andras Nagy, Ph.D., Mt. Sinai Hospital, Toronto, Su-Chun Zhang, M.D., Ph.D., University of Wisconsin

Saturday, August 13

SESSION II, cont: Advances in Mammalian Stem Cell Research (Barbara Knowles, PhD, Chair)

"hESC Mutants" Lars Ahrlund-Richter, Ph.D., Karolinska University Hospital

"Programmed Cell Death Pathways are Essential for Maintaining Pluripotency" Thomas Zwaka, M.D., Ph.D., Baylor College of Medicine

"Leukemia Stem Cells: Transformation of Committed Hematopoietic Progenitors with Leukemia Oncogenes" Gary Gilliland, M.D., Ph.D., HHMI, Brigham and Women's Hospital

"Teratomas Produced from Xenografted Embryonic Stem Cells" Ivan Damjanov, M.D., Ph.D., University of Kansas Medical Center

"Multilineage Hematopoietic Development from Human Embryonic Stem Cells" Dan Kaufman, M.D., Ph.D., University of Minnesota

"Nuclear Reprogramming of Somatic Cells after Fusion with Human Embryonic Stem Cells" Chad Cowan, Ph.D., Harvard University

SESSION III: Comparative models in development and Organogenesis (David Barnes, PhD, Chair)

"What Does it Take to Make an Adaptive Immune System?" Chris Amemiya, Ph.D., Benaroya Research Institute

"Erythroid Progenitor Cell Survival Skills" Don Wojchowski, Ph.D., Maine Medical Center Research Institute

"Cyclical, Whole Body Regeneration in a Primitive Chordate" **Tony DeTomaso, Ph.D.**, Stanford University

"Segment Boundary Formation during Zebrafish Development" Clarissa Henry, Ph.D., The University of Maine

"Highly Diversified Families of Immune-type Receptors in Vertebrates and Protochordates" Gary Litman, Ph.D., All Children's Hospital, Univ. S. Florida

"A Genetic Screen in Zebrafish Identifies Genes Required for Liver Development" Kirsten Sadler, Ph.D., MIT

"Assembling the Vascular System" Brant Weinstein, Ph.D., NICHD/NIH

"Evidence in L. erinacea for a Primordial Vertebrate Colon" Nicole Theodosiou, Ph.D., Bowdoin College

#### **EVENING PROGRAM**

Panel Discussion: Gary Gilliland, M.D., Ph.D., The Cancer Stem Cell Leonard Zon, M.D. – Clinical Developments of Stem Cell Research Edward Benz, M.D. – Moderator

Sunday, August 14 SESSION III, con't: Comparative models in development and Organogenesis (Jonathan Epstein, M.D., Chair)

"Hematopoietic Stem Cell Fate is Established by the Notch-Runx pathway" Leonard Zon, M.D., HHMI/The Children's Hospital

"Study of Zebrafish Hematopoietic Stem Cells" David Traver, Ph.D., University of California – San Diego

"Acute Renal Failure in Zebrafish: A Novel System to Study a Complex Disease" Joseph Bonventre, M.D., Ph.D., Brigham and Women's Hospital

"Adult Epithelial Stem Cells and Their Possible Involvement in Continuous Tooth Replacement in Non-mammalian Vertebrates" **Anne Huysseune**, **Ph.D.**, Ghent University

Hermann Haller, M.D., Hannover Medical School and MDI Biological Laboratory

"Exploring Blood Vessel Heterogeneity Using the Zebrafish" Nathan Lawson, Ph.D., Univ. Massachusetts Medical School

"Gentics and Genomics in Xenopus" Paul Mead, Ph.D., St. Jude Children's Research Hospital

"Specification of the Zebrafish Pancreas" Victoria Prince, Ph.D., University of Chicago

Final Comments, David Barnes, Ph.D., MDI Biological Laboratory

September 15-17 Strategic Conference of Zebrafish Investigators Sponsored by The National Institute of Child Health and Human Development, The National Institutes of Health, and the US Department of Health and Human Services.

Thursday, September 15

Welcome to the laboratory, John N. Forrest, Jr., M.D., Director, MDI Biological Laboratory

Welcome to the conference, Brant Weinstein, Ph.D., NICHD/NIH

SESSION I: Early Patterning (Diane Slusarski, Ph.D., Chair)

"Maternal Effects of Vertebrate Development" Mary Mullins, Ph.D., University of Pennsylvania

"Analysis of Zebrafish Maternal-Effect Genes" Francisco Pelegri, Ph.D., University of Wisconsin

"Cellular and Genetic Mechanisms of Convergence and Extension in Zebrafish" Lilianna Solnica-Krezel, Ph.D., Vanderbilt University

"Organizer Formation and Dorsoventral Patterning in the Zebrafish Embryo" Eric Weinberg, Ph.D., University of Pennsylvania.

"SQT and CYC Pattern the Germ Layers by a Timing Dependent Mechanism" Scott Dougan, Ph.D., University of Georgia.

"Dorso-Vental Axis Formation and its Linked Patterning of Neurogenesis" Masahiko Hibi, M.D., Ph.D., Center for Developmental Biology, RIKEN

"Laterality of the Habenulointerpeduncular System" Marnie Halpern, Ph.D., Carnegie Institution

"Molecular Specification of Asymmetry in the Zebrafish Epithalamus" Josh Gamse, Ph.D., Vanderbilt University

"Left Brain and Right Brain: Using the Zebrafish to Study Development of CNS Asymmetry" **Stephen Wilson, Ph.D.**, University College London

"Trangenic Zebrafish Reveal Stage-Specific Roles for BMP Signaling in Ventral and Posterior Mesoderm Development" **David Kimelman, Ph.D.**, University of Washington

SESSION II: Segmentation, Patterning, Myogenesis (Simon Hughes, Ph.D., Chair)

"Notch Signaling, Gut Cell Renewal, and the Somite Segmentation Clock" Julian Lewis, D. Phil, Cancer Research UK

"Patterning and Boundary Formation in the Hindbrain" Cecilia Moens, Ph.D., HHMI/Fred Hutchinson Cancer Research

"Modeling Motoneuron Disease in Zebrafish" Christine Beattie, Ph.D., The Ohio State University

"Cooperation Between HHIP and Patched Regulates Zebrafish Skeletal Muscle Development" Monte Westerfield, Ph.D., University of Oregon

"Tortuga Refines Notch Pathways Gene Expression in the Zebrafish Presomitis Mesoderm at the Post-Transcriptional Level" Sharon Armacher, Ph.D., University of California

"Genetic Control of Skeletal Muscle Formation in the Zebrafish Embryo" Peter Currie, Ph.D., The Victor Chang Cardiac Research Institute

"A Zebrafish Model of Rigid Spine Muscular Dystrophy" **David Grunwald, Ph.D.**, University of Utah

"Medaka and Zebrafish Complement for Uncovering Vertebrate Genome Functions" Makoto Furutani-Seiki, M.D., Ph.D., Japan Science and Technology Agency

"Genetic Regulation of Iridophore Development" Robert Kelsh, Ph.D., University of Bath

"Genome Duplication and the Evolution of Zebrafish Developmental Mechanisms" John Postlethwait, Ph.D., University of Oregon

"Evolution of Regulatory Elements: Lessons from the Zebrafish Neurogenin1 Gene" Uwe Straehle, M.D., University of Heidelberg

## COMMUNITY MEETING I – Genomics (Leonard Zon, Ph.D., Chair) Robert Geisler, Ph.D. Cecilia Moens, Ph.D. Jane Rogers, Ph.D. And Panelists

**POSTER SESSION I** – Dahlgren Hall

Friday, September 16

SESSION III: Neural I (Kristin Artinger, Ph.D., Chair)

"How Does Internalization of Delta Facilitate Activation of Notch?" Ajay Chitnis, Ph.D., NICHD/NIH

"Neural Cell Fate Specification in Embryonic and Postembryonic Zebrafish" Bruce Appel, Ph.D., Vanderbilt University

"Casanova and the Control of Neurogenesis" Frederic Rosa, Ph.D., INSERM

"Notch, Integrin, and the Control of Somitogenesis" Scott Holley, Ph.D., Yale University

"Genetic Analysis of Neural Circuit Formation" Hitoshi Okamoto, M.D., Ph.D., RIKEN Brain Science Institute

"Specification and Function of Zebrafish Interneurons" Shin-ichi Higashijima, Ph.D., National Institutes of Natural Science

"Development of Zebrafish Motoneurons" Judith Eisen, Ph.D., University of Oregon

"Live Imaging of Growing Axons in Vivo Reveals Mechanisms of Axon Guidance" Mary Halloran, Ph.D., University of Washington

"Regulation of Neural Development and Behavior: From MIRNAS to TRP Channels" Alexander Schier, Ph.D., NYU School of Medicine

"ERBB3 and ERBB2 are Essential for Schwann Cell Migration and Myelination in Zebrafish" William Talbot, Ph.D., Stanford University

"Signaling Centers Regulating Forebrain Patterning and Neuronal Differentiation" Corinne Houart, Ph.D., Kings College London

"AP-2 Transcription Factors and Cranial Neural Crest Development" Thomas Schilling, Ph.D., University of California

# COMMUNITY MEETING II – Community Resources (Monte Westerfield, Ph.D., Chair) Keith Cheng, M.D., Ph.D. Monte Westerfield, Ph.D. Zoltan Varga, Ph.D. And Panelists

#### **POSTER SESSION II** – Dahlgren Hall

SESSION IV: Neural II (Chair, TBN)

"The Search for Visual and Other Behavioral Mutants in Zebrafish" John Dowling, Ph.D, Harvard University

"Assembly and Function of Visual Channels in Zebrafish" Herwig Baier, Ph.D., University of San Francisco

"Molecular Mechanisms Regulating Rentinal Neurogenesis in Zebrafish" Ichiro Masai, Ph.D., RIKEN

"The Role of FGF-Receptors and DLX3B/4B in Regulating Competence for Optic Placode Induction and Development" Andreas Fritz, Ph.D., Emory University

"Neurogenesis, Cell Migration, and Planar Cell Polarity in the Zebrafish Lateral Line" Tatjana Piotrowski, Ph.D., University of Utah

"Screening for Modulations of Hair Cell Toxicity in the Lateral Line" David Raible, Ph.D., University of Washington

"Sex, Smell, and Videotapes: The Complex Interplay of Olfactory and GNRH Precursor Cells in the Vertebrate Embryo" Kathleen Whitlock, Ph.D., Cornell University

"Genetic Analysis of Dopaminergic System Development in Zebrafish" Wolfgang Driever, **Ph.D.**, University of Freiberg

"Motor Behavior Regulation in Zebrafish" Michael Granato, Ph.D., University of Pennsylvania

"From Forebrain Patterning to Neural Connectivity: Glial and Axon Guidance in the Zebrafish Forebrain" Rolf Karlstrom, Ph.D., University of Massachusetts

"Zebrafish as a Model Organism for Degenerative Brain Diseases" Pertti Panula, M.D., Ph.D., University of Helsinki

#### Saturday, September 17

SESSION V: Organogenesis I (Lisa Steiner, M.D., Chair)

"Studies of Blood Development in Zebrafish" Leonard Zon, M.D., HHMI/Children's Hospital, Boston

"Genetic Studies of Myeloid Hematopoietic Development in the Zebrafish" Graham Lieschke, Ph.D., Ludwig Institute for Cancer Research

"Understanding Runx Gene Function in Different Cell Lineages" Phil Crosier, Ph.D., University of Auckland

"Genetic Mechanisms Regulating Cardiac Form and Function" John Mably, Ph.D., Massachusetts General Hospital

"Calcium Homeostasis Regulates Embryonic Cardiac" Jau-Nian Chen, Ph.D., University of California, Los Angeles

"Chemical Genetic Modifier Screens" Randall Peterson, Ph.D., Massachusetts General Hospital

"FGF Signaling Regulates Myocardial Differentiation During During Zebrafish Heart Regeneration" Kenneth Poss, Ph.D., Duke University

"Building Vascular Networks During Development" Brant Weinstein, Ph.D., NICHD/NIH

"ETS1-Related Protein is Key Regulator of Vasculogenesis in Zebrafish" Shuo Lin, Ph.D., University of California, Los Angeles

"Instructive Control of Fin Ray Growth by Arteries" Stephen Johnson, Ph.D., Washington University Medical School

"Cilia Function in Organogenesis" Iain Drummond, Ph.D., Massachusetts General Hospital/Harvard Medical School

SESSION VI: Organogenesis II (Steven Leach, M.D., Chair)

"Patterning the Facial Skeleton" Charles Kimmel, Ph.D., University of Oregon

"The Zebrafish Stumpf Mutations Caused Sever Craniofacial Malformations and Eye Defects by Blocking a Critical Step of N-Glycosylation" Ela Knapik, M.D., Vanderbilt University

"Using Forward Genetics to Discover Novel Genes Involved in Intestinal Development in Zebrafish" Joan Heath, Ph.D., Ludwig Institute for Cancer Research

"A Genetic Screen for Mutations Affecting Organogenesis of Medaka and the Molecular Aspect of Medaka Fin Regeneration" **Akira Kudo, Ph.D.**, Tokyo Institute of Technology

"Cancer Modifier Gene Identification in Zebrafish" Michael Pack, M.D., University of Pennsylvania

"Functional Analysis of Zebrafish Vitamin D Receptor Orthologues" Iain Shepherd, D. Phil., Emory University

"Chemical Screening for Modulators of FGF and BMP Signaling" Michael Tsang, Ph.D., University of Pittsburgh

"Fishing for Functional DNA: Conserved Regulatory Control in the Absence of Sequence Conservation" **Shannon Fisher, M.D., Ph.D.,** John Hopkins University School of Medicine

"Requirements for TRAP230 Function in Organogenesis is Revealed by the Kohtalo Mutation" Igor Dawid, Ph.D., NICHD/NIH

"Promethus Regulates Liver Development" **Didier Stainier, Ph.D.**, University of California, San Francsico

"Expression of Coatomer mRNA in Zebrafish Notochord Progenitors is Controlled by the Unfolded Protein Response" **Derek Stemple, Ph.D.**, Wellcome Trust Sanger Institute

**COMMUNITY MEETING III** – *Technology* (Alexander Schier, Ph.D., Chair)

Shawn Burgess, Ph.D. Wenbiao Chen, Ph.D. James Chen, Ph.D. Stephen Ekker, Ph.D. Koichi Kawakami, Ph.D. And Panelists Saturday, September 17

SESSION V: Organogenesis I (Lisa Steiner, M.D., Chair)

"Studies of Blood Development in Zebrafish" Leonard Zon, M.D., HHMI/Children's Hospital, Boston

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COMMUNITY MEETING III - Technology (Alexander Schier, Ph.D., Chair)

Shawn Burgess, Ph.D. Wenbiao Chen, Ph.D. James Chen, Ph.D. Stephen Ekker, Ph.D. Koichi Kawakami, Ph.D. And Panelists

# **2005 COURSES**

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January 17 - 21	Laboratory in Behavioral Neuroscience – Part A Bowdoin College INBRE Course Rich Thompson, PhD, Bowdoin College
February 28 - March 10	Functional Genomics of Membrane Transport The University of Maine INBRE Course Denry Sato, DPhil and Bruce Stanton, PhD
March 13 – 17	Laboratory in Behavioral Neuroscience – Part B Bowdoin College INBRE Course Rich Thompson, PhD, Bowdoin College
May 9 – 20	Environmental Toxicology Bates College INBRE Course Rebecca Sommer, PhD, Bates College
May 21 – 27	Molecular Biology Research Techniques The University of Maine: Farmington and Machias INBRE Course David Towle, PhD
May 28 – June 4	Structure and Function of Polarized Epithelial Cells University of Pittsburgh School of Medicine Mark Zeidel, MD, U. Pittsburgh School of Medicine
June 4 – 11	Seventh Annual Intensive Course in Quantitative Fluorescent Microscopy Simon Watkins, PhD, U. Pittsburgh School of Medicine
June 8 – 9	NCBI Field Guide to PubMed and Bioinformatics Resources Carolyn Mattingly, PhD, and Ben King, MS
June 11 – 18	Structure and Function of Polarized Epithelial Cells Yale University School of Medicine John N. Forrest, Jr., MD
July 26	UNIX Workshop Bioinformatics Core workshop Carolyn Mattingly, PhD
August 8 - 10	PERL Worskhop Bioinformatics Core workshop Carolyn Mattingly, PhD

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September 17 – 23

Health and Colony Management of Laboratory Fish Paul Bowser, PhD, Cornell University and Jan Spitsbergen, PhD, Oregon State University, Mike Kent, PhD, Oregon State University

## **PUBLICATIONS**

Beltz, B.S., Benton, J.L., Sandeman, D.C. (2005). Adult neurogenesis in the crustacean brain: comparative cell cycle dynamics and regulatory controls. *Society for Neuroscience Abstracts* 31:366.2.

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