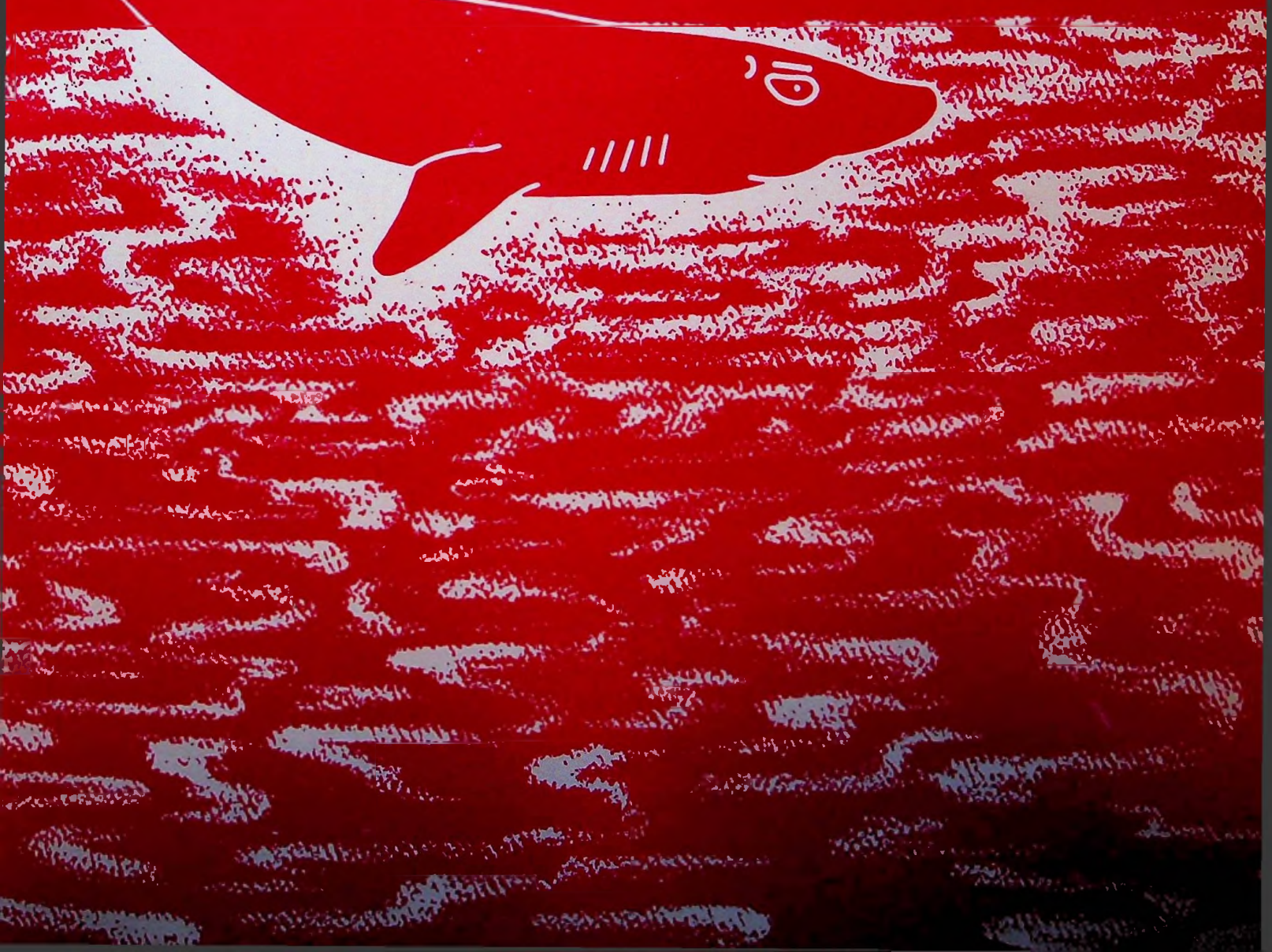
Volume 20 · 1980

THE BULLETIN

Mount Desert Island Biological Laboratory

Salsbury Cove, Maine



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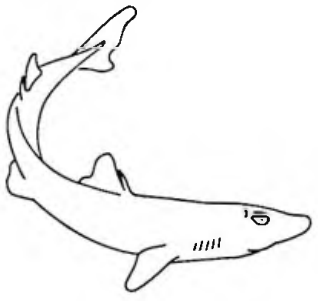

Volume 20 **Issued 1981**

CONTENTS

THE MOUNT DESERT ISLAND BIOLOGICAL LABORATORY

DESCRIPTION OF FACILITIES

The Mount Desert Island Biological Laboratory is an independent marine biological station on the coast of Maine near the mouth of the Bay of Fundy which provides a research facility for investigations on local flora and fauna. There is laboratory space for 35 research programs. Certain specialized equipment is available. During 1980 there were 129 scientific personnel representing 39 institutions in 18 states and abroad. The personnel included 39 Principal Investigators of faculty rank. The work of the laboratory covers a broad area of biology, comparative physiology and biochemistry. Advanced undergraduate, graduate, medical and postdoctoral students spend the summer under supervision of senior investigators.

No formal courses are given, but weekly formal and informal seminars are scheduled. Effective in 1971, some year-round programs have been established.

The laboratory administration solicits and welcomes applications from all qualified scientists whose programs can be best fostered in its environment. With rare exceptions, investigators are required to utilize local flora and fauna. Opportunity to work at MDIBL is advertised annually in the journal Science. Recently the number of applications has exceeded the capacity of the laboratory. Applications are screened for scientific merit by a Scientific Advisory Committee, made up of investigators who have worked at the laboratory for some time, and then by the Executive Committee, for feasibility and setting of priorities of acceptance. New investigators usually constitute 30% to 40% of the summer population. Acceptance notices are issued in late March or early April for tenancy in June.

History and Organization

The Laboratory was founded in 1898 by J. S. Kingsley of Tufts College and its original location was at South Harpswell, Maine. The site at Salsbury Cove was donated to the Laboratory by the Wild Gardens of Acadia, a group instrumental in the establishment of Acadia National Park, and removal to this location was completed in 1921. The first laboratory buildings, the original salt-water system, and some of the residential cottages were constructed or obtained by the gifts of local summer residents.

The Mount Desert Island Biological Laboratory was incorporated in 1914 under the laws of the State of Maine as a non-profit scientific and educational institution, and it is owned and operated by the Trustees and members of the Corporation. At present there are over 400 members of the Corporation. It functions with minimal full-time professional administrative personnel and in many ways it is a cooperative enterprise. Income is derived from membership dues, laboratory fees, cottage rentals, investments, private and corporate donations, and grants. The business and scientific management of the Laboratory is in the hands of the Director and the Board of Trustees.

The Directors have been: Ulrich Dahlgren, Princeton University (1920-26); H. V. Neal, Tufts College (1926-31); William H. Cole, Rutgers University (1931-40); Roy P. Forster, Dartmouth College (1940-47); J. Wendell Burger, Trinity College (1947-50); Warner F. Sheldon, University of Pennsylvania (1950-56); Raymond Rappaport, Jr., Union College (1956-59); Alvin F. Rieck, Marquette University (1959-64); William L. Doyle, University of Chicago (1964-67); Charles E. Wilde, Jr., University of Pennsylvania (1967-70); H. V. Murdaugh, Jr., University of Pittsburgh (1970-75); Richard M. Hays, Albert Einstein College of Medicine (1976-79); Leon Goldstein, Brown University (1979-).

Location

Mount Desert Island lies in the Gulf of Maine about 120 miles northeast of Portland, and is connected to the mainland by a short bridge. Year-round air service is available to Bangor, Maine with connecting flights on Bar Harbor Airlines, as well as direct flights from Boston to Bar Harbor. The island has an area of more than 100 square miles and is traversed east to west by a range of glaciated mountains and north to south by a narrow fjord six miles long that partially divides the east and west halves. Among the mountains lie several deep fresh water lakes and shallow ponds. Much of the mountainous area is a part of Acadia National Park. The island is separated from the mainland and adjacent islands by narrow deep bays. Spring tides average 13.2 feet.

The many varied biological resources of the Acadian area are readily available. In summer, the cold waters of the Gulf of Maine are rich in marine life. The rocky shores, and flats, and strong tital currents provide a variety of habitats. Fresh water lakes and ponds and the mixed terrain give further diversity to the forms available. Certain of these are abundant, others are scarce. The research abstracts in past Bulletins will give a good indication of the common forms. The Director will be glad to furnish an estimate of the availability of any special forms.

Physical Plant

The Laboratory is situated on a tract of about 250 acres fronting on Frenchman Bay at Salsbury Cove in the Township of Bar Harbor. In addition to shore frontage, the Laboratory owns part of a fresh water pond and brook, and its land varies from meadow and forest to sphagnum bog. Investigation is carried on in single story buildings of frame construction located along the shore. These buildings are as follows:

Neal Laboratory: This, the oldest and largest of the laboratory buildings, was remodeled in 1955 and now contains eight laboratories: four large rooms that will each accommodate 3 to 4 persons, and four small rooms suitable for single investigators. All rooms are provided with gas and fresh and salt water. Water troughs, aquaria, and larger tanks are located along the north wall outside.

Halsey Laboratory was remodeled in 1961 and consists of four rooms, each capable of accommodating 3 to 4 persons. The rooms all have gas, fresh and salt water. Refrigerators, and aquaria are located on a common terrace at the entrance to the building.

Marshall Laboratory, a new year-round facility, contains five laboratories and a full basement which includes a tank room, common instrument space, and office space.

The Kidney Shed is a single large laboratory. It accommodates two research groups.

Hegner Laboratory contains 9 laboratory rooms provided with salt and fresh water, each accommodating 1 to 3 persons. It is next on the list of buildings to be remodeled.

Karnofsky Laboratory, constructed in 1970, contains 4 large laboratories, one large enough to accommodate 2 research groups. This is now a year-round facility.

Union Station, erected In 1962, contains two laboratories, each suitable for 2 to 3 persons, and is equipped with salt and fresh water.

The Instrument Shed was renovated in 1979 for the purpose of housing equipment used in common by members of the Laboratory. In 1969 one-half of this space was equipped as a research laboratory.

Lewis Laboratory, renovated in 1979, contains two laboratories.

Biophysics Building: This air-conditioned building was erected in 1965. It houses isotope counting systems, ultracentrifuges, spectrophotometers, and sectioning equipment for electron microscopy.

Director's Office: A separate building contains the Director's Office and a small conference room.

Shop: A centrally located frame building that houses supplies, equipment, and machinery and serves as the headquarters for the Plant Manager.

Business Office and Library: In the same building as the shop, it also houses an additional common instrument room.

Dahlgren Hall: The former village schoolhouse, was purchased and converted to use as a meeting hall; it also houses a reprint collection. The single large room can seat about 120 persons and is equipped with projectors.

Dining Hall (Co-op): This dining hall and living room for about 20 junior investigators and students was built in 1963. It is operated by a cook-manager. A small general library of books and records and a record player have been furnished by private donation.

Bowen Hall: Is one of the oldest remaining examples of early 19th century Island architecture. It now serves as one of four dormitories and has a common room for young women.

Support Facilities

Dock: The dock consists of two floats with live wells and attached live cars for storage of specimens. It is attached to the shore by an inclined ramp and a bridge and abutment.

Collecting Boats: A 32' gasoline powered collecting boat, the Squalus, was built in 1958. It is provided with a circulating water tank for the transportation of specimens. Arrangements can be made with local fishermen for offshore specimens. A Nova Scotia skiff with an outboard motor is also used for collecting and skiffs are available to investigators. A motor launch is used for access to bird breeding colonies.

Pick-up Trucks are used for laboratory operations and specimen transport.

Housing

Sixteen cottages suitable for families with children stand on land owned by the Laboratory and are within easy walking distance of it. The cottages are rented by the season, or occasionally for shorter periods. Occupants must supply their own blankets and linen, as well as pay the Laboratory for the use of the cottage (which includes utilities and garbage disposal). Rent is $990 to $1210 per season, depending upon the size of the cottage. A few privately owned cottages are also available for rental near the Laboratory, and in other communities on the Island. The Laboratory business office maintains a list of available rentals. An automobile is essential for family mobility in the area.

In addition, seven cottages are presently privately owned but located on Laboratory property under a special leasehold arrangement.

Single investigators, student assistants, and couples without children rent rooms in the village or in Laboratory dormitories and take their meals in the Laboratory Dining Hall. The weekly charge for meals is based on self-sustaining nonprofit operation.

Four dormitories (two for men and two for women) are available for summer laboratory assistants. They are relatively old wooden buildings.

Recreational Activities

Mount Desert Island has long been known to have one of America's most desirable summer climates. The ocean, rocky shores, and mountains provide scenery of unexcelled beauty. The distance from large metropolitan areas has so far helped to keep it relatively unspoiled. Swimming, hiking, mountain climbing, picnicking, boating and sailing, tennis, golf, and other sports are readily available. Acadia National Park with its excellent naturalists' program contributes to the general interest. There are small museums of Indian and local lore, public gardens, a good public library and cultural exhibits. Proximity to the Jackson Laboratory adds scientific interest and resources. Salsbury Cove is an old fishing and farming community on the northern shore of the Island near the main road from Bar Harbor to Ellsworth. It has one general store and Post Office. The Laboratory colony comprises about 180 adults and 80 children of assorted ages, and forms a considerable portion of the summer population of the village. Bar Harbor, the largest town on Mount Desert Island, is about six miles from the Laboratory and provides many of the services of a city including excellent shopping facilities and a good hospital.

Acknowledgments

The Mount Desert Island Biological Laboratory is indebted to the National Science Foundation and the National Institutes of Health for substantial support in the past. Funds for renovations of buildings and new construction have permitted the Laboratory to expand and upgrade its facilities. Contributions to operating costs and for specialized research equipment have greatly improved the efficiency of research activities. The individual research projects which have been served by this Laboratory are variously funded by private and government agencies and by individuals and all of these projects have benefited from the NSF and NIH grants to the Laboratory. Current support from NSF under Grant DEB-7836821 is gratefully acknowledged. Additional support has been provided by NIH Biomedical Research Support Grant SO7 RR 05764.

Applications

Fees for research space vary according to the demand made on the facilities. They range from approximately $450 to $2480, depending on the space assigned and the number of workers. Special arrangements may be made for facilities beyond the summer season (June 15 - September 15). All investigators have the use of the general facilities, but special arrangements are necessary if unusual demands are anticipated. Investigators are urged to bring their own specialized equipment and chemicals. On occasion, the Laboratory may be able to provide apparatus which would have long-term usefulness for other workers. Isotope counting systems and ultracentrifuges are available on a fee basis. Persons planning to use isotopes must make prior arrangements in conformity with our Radiation Safety Committee requirements.

Limited fellowships are supported by funds from the Ulrich Dahlgren Memorial Fund (a gift from the American Philosophical Society) and other memorial funds.

In an effort to make our specimen collecting facilities as self-supporting as possible, fees change almost annually. This year's fees ranged from $5 for dogfish and skates, to $50 per trip for unusual specimens. Some of the commonly used organisms include:

PISCES: Myxine glutinosa, Hagfish; Squalus acanthias, spiny dogfish; Raja erinacea, little skate; Anguilla rostrata, eel; Fundulus heteroclitus, killifish; Lophius americanus, goosefish; Myxocephalus sp., sculpins; Pholis gunnellus, rock eel; Pseudopleuronectes americanus, winter flounder; Macrozoarces americanus, eelpout.

INVERTEBRATES: Echinarachnius parma, sand dollar; Pagurus sp., hermit crabs; Homarus americanus, lobster; Boltenia ovifera, sea potato.

Other native fauna under investigation include: echinoderms, oligochaetes, gastropods, frogs and salamanders, and marine birds.

Applications and inquiries should be addressed to the Laboratory Director, Dr. Leon Goldstein.

June 15 - August 31
Mount Desert Island Biological Laboratory
Salsbury Cove, ME 04672
(207) 288-3605

Division of Biomedical Sciences
Brown University - Box G
Providence, RI 02912 (401) 863-3341

Inquiries regarding specific matters such as laboratory charges and facilities can also be directed to:

Mr. Jonathan S. Gormley
Executive Secretary
Tel. (207) 288-3605 Mount Desert Island Biological Laboratory
Salsbury Cove, ME 04672

IN MEMORIAM

ALBERT H. CUNNINGHAM
HANCOCK GRIFFIN, JR.
GLENN WEBBER

Our Laboratory has suffered grievous loss in the deaths of three current or former trustees each of whom has represented us in the Town of Bar Harbor in many important ways.

ALBERT H. CUNNINGHAM until 1970 a Trustee and Treasurer and always a strong friend and advisor.

HANCOCK GRIFFIN, JR. served as Trustee and legal counsel for the Laboratory since 1968. A distinguished lawyer, he gave generously of his talents providing us with the invaluable benefits of his broad experience and advice in the goverance of our affairs.

GLENN WEBBER served as Trustee since 1974. He furnished the laboratory frequent practical assistance in solving complex problems of maintenance and in meeting emergency situations involving major construction. His advice and generosity saved us much major expense. As a member and chairman of the Town Council of Bar Harbor he provided a most important link to the local community.

THE MOUNT DESERT ISLAND BIOLOGICAL LABORATORY

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*Deceased June 30, 1980

**Deceased October 14, 1980

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THE MOUNT DESERT ISLAND BIOLOGICAL LABORATORY

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THE MOUNT DESERT ISLAND BIOLOGICAL LABORATORY

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THE MOUNT DESERT ISLAND BIOLOGICAL LABORATORY

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Philip Yund	Brown University
Jose Zadunaisky	New York University Medical Center

WINTER SEMINAR SERIES

1979 - 1980

October 24. "Estimating the single nephron glomerular filtration rate with the electron microscope", Dr. Joseph F. Gennaro, Laboratory of Cellular Biology, New York University.

November 7. "Fluid production by crab midgut caecum", Dr. Charles W. Holliday, Mount Desert Island Biological Laboratory.

November 15. "Urinary concentrating mechanism in the desert rodent Psammomys obesus", Dr. Rex L. Jamison, Division of Nephrology, Department of Medicine, Stanford University School of Medicine.

November 28. "The influence of decerebration on water and ion regulation in an intertidal Oligochaete, Clitellio arenareous", Dr. Joan D. Ferraris, Mount Desert Island Biological Laboratory.

December 5. "The concentrating mechanism of the kidney: New observations from kidneys with intact renal pelvis", Dr. Bodil Schmidt-Nielsen, Mount Desert Island Biological Laboratory.

December 19. "Recent advances in prairie dog physiology", Dr. Larry N. Reinking, Mount Desert Island Biological Laboratory.

January 16. "Renin and aldosterone in conscious diabetes insipidus (DI) rats: a paradox?", Dr. Lewis Kinter, Department of Physiology, Harvard Medical School.

January 23. "Renal papillary cells: unusual physiology in an unusual environment." Dr. Reinier Beeuwkes, Department of Physiology, Harvard Medical School. William B. Kinter Memorial Seminar.

January 30. "Scanning colorimetry of bilayer membranes", Dr. Donald Mountcastle, Department of Physics, University of Maine at Orono.

February 13. "Diabetes gene expression in pancreatic alpha-cells", Dr. Edward Leiter, Jackson Laboratory.

February 20. "Sites of heavy metal action in transporting epithelia", Dr. David Miller, Mount Desert Island Biological Laboratory.

February 27. "Marine ecological studies in Antarctica", Dr. John Dearborn, Department of Zoology, University of Maine at Orono.

March 13. "The architecture and structural organization of the kidney", Dr. J. Michael Barrett, Department of Anatomy, Medical College of Georgia.

March 19. "Genetic linkage in the mouse", Dr. Thomas Roderick, Jackson Laboratory.

March 26. "Cell volume regulation and amino acid metabolism in skates", Dr. Leon Goldstein, Division of Biology and Medicine, Brown University.

April 10. "Role of bivalent cations in oxidative phosphorylation", Dr. John Howland, Department of Biology, Bowdoin College.

April 16. "Nesting density, behavior and reproductive success in the Great Black-backed Gull (L. marinus)", Dr. Ronald Butler, Mount Desert Island Biological Laboratory.

April 23. "Oil pollution and sea birds", Dr. David Miller, Mount Desert Island Biological Laboratory.

April 24. "Renal medullary blood flow", Dr. David B. Moffat, Department of Anatomy, University College, Cardiff.

1980 TUESDAY EVENING SEMINARS

Held at 8:00 p.m., Dahlgren Hall

July 8. "The tidal flat environment and responses to activities of clam diggers", Dr. Leslie E. Watling, Assistant Professor, University of Maine at Orono. Project Director, Multi-disciplinary Sea Grant Project, Darling Marine Center, Walpole, Maine.

July 15. "Some thoughts on tumor biology", Dr. Richmond Prehn, Staff Scientist, Jackson Laboratory, Bar Harbor, Maine.

July 22.	"Molecular exchanges, extractions and net fluxes across the pulmonary endothelium: possible pathways and mechanisms", Dr. Francis P. Chinard, Professor of Experimental Medicine, Professor of Physiology, CMDNJ-New Jersey Medical School.
July 29.	"Polarity of Transport in brain capillaries", Dr. Gary Goldstein, Director, Section of Pediatric Neurology, University of Michigan Medical Center.
August 1.	"Lipids as fuels for fish during starvation", Dr. Eric A. Newsholme, Department of Biochemistry, Oxford University England.
August 6.	"Regulation of protein phosphoyrlation in the nervous system", Dr. Paul Greengard, Professor, Department of Pharmacology, Yale School of Medicine.
August 12.	"The value of structural studies in understanding regulation of epithelial transport", Dr. James Wade, Assistant Professor, Department of Physiology, Yale School of Medicine.
August 19.	Dr. Bodil Schmidt-Nielsen, Research Scientist, Mount Desert Island Biological Laboratory, Salsbury Cove, Maine.
August 26.	"Possible role of angiotensins in the regulation of blood pressure", Dr. M. C. Khosla, Staff Research Scientist, Cleveland Clinic Foundation.

1980

Thursday Noon (Brown Bag) Seminars

July 3.	Drs: Rappaport and Beyenbach	August 7.	Drs. Frizzell and Newsholme
July 10.	Session I of "Who and what we are"	August 14.	Drs. Erlij and Masur
July 17.	Session II (as above)	August 21.	First Annual Poster Seminar
July 31.	ANNUAL MEETING	August 28.	Drs. Bend and Goldstein

FRIDAY MORNING MEETINGS - 8:00 a.m.

July 11.	"NaCl/KCl cotransport by avian erythrocytes", Clive Palfrey
July 18.	"Mechanism of active Cl secretion by canine trachael epithelium (I)", Raymond Frizzell, Philip Smith and Michael Welsh.
July 25.	"Trachea (II)".
August 1.	"pH control of Cl^- transport", Michael Field.
August 8.	"Calcium compartments and fluxes in smooth muscle", Casey Vanbreeman.
August 15.	"Vesicles and transport", Rolf Kinne.
August 22.	"A thermodynamically plausible model of gastric acid secretion", George Kidder.

THE MOUNT DESERT ISLAND BIOLOGICAL LABORATORY

First Annual Poster Seminar - 1980

1. TAURINE EXCRETION IN ELASMOBRANCHS; Helmut Schröck, Roy P. Forster, Leon Goldstein, Kimberlee Sorem, and Susanne Goldstein.
2. EFFECTS OF DRILLING FLUIDS ON EMBRYO DEVELOPMENT; Richard Crawford, Jonathan Gates and Nancy Crawford.
3. MICROVASCULATURE OF ELASMOBRANCH GILL; Barbara Kent, Michael Levy and Ken Olson.
4. POTASSIUM TRANSPORT BY FLOUNDER URINARY BLADDER; David Dawson and David Andrew.
5. HETEROGENEITY OF BENO(a)PYRENE HYDROXYLASE AND 7-ETHOXYRESORUFIN DEETHYLASE ACTIVITY IN WILD WINTER FLOUNDER - EVIDENCE OF PREINDUCTION; G.L. Fourman, J.R. Fouts, C.N. D'Amico, and A.T. vom Scheidt.
6. NaCl ABSORPTION BY FLOUNDER INTESTINE: EFFECTS OF REDUCED pH; P.L. Smith, S. Orellana, C.P. Stewart, M. Welsh, M. Musch, L. Kimberg, M. Field and R.A. Frizzell.
7. THE EFFECT OF PARDAXIN (TOXIN) ON PERMEABILITY TO UREA IN THE DOGFISH AND IN THE ISOLATED RECTAL GLAND; Naftali Primor, Jose Zadunaisky, John Forrest and Victor Murdaugh.
8. FUNCTIONAL ANATOMY OF INNER MEDULLARY COLLECTING DUCTS IN HAMSTERS; Bodil Schmidt-Nielsen, Bruce Graves and Hal Church.
9. RENAL AMMONIAGENESIS IN NORMAL AND ACIDOTIC DOGFISH; Pat King, Leon Goldstein, Suzanne Goldstein and Pat McLaughlin.
10. EVIDENCE OF A RIBOSE SPECIFIC (Ra) SUBCLASS OF ADENOSINE RECEPTORS IN THE DOGFISH RECTAL GLAND; J.N. Forrest, D. Reick, A. Murdaugh.
11. K^+ ion, PHYSIOLOGICAL TRIGGER FOR CATECHOLAMINE RELEASE; Rob Carroll, David Opdyke and Nancy Keller.
12. PAH TRANSPORT BY ROCK CRAB URINARY BLADDER; C.W. Holliday and D.S. Miller.
13. DOSING ADULT LEACH'S PETRELS REDUCES CHICK GROWTH RATES; D.S. Miller, David Peakall, Ronald Butler and Wayne Trivelpiece.
14. THE STORY OF THE SEA POTATO HEART; Stephen Dillon and Martin Morad.
15. GROWTH AND MATURATION IN SQUALUS; Peter Woodhead and Avril Woodhead.
16. ELECTROPHYSIOLOGY OF Ca^{2+} TRANSPORT IN SHARK VENTRICLES; James Maylie and Martin Morad.
17. EFFECT OF ALTERATION OF Na GRADIENT ON CONTRACTILITY OF Ca^{2+} TRANSPORT; Casey Vanbreeman, James Maylie and Martin Morad.
18. MAXIMUM GRADIENT IN DOGFISH GASTRIC MUCOSA; G. Kidder.
19. LACK OF K^+ HOMEOSTASIS IN SKATE CNS; Ken Mackie and Helen Cserr.

PRINCIPAL INVESTIGATORS AND THEIR RESEARCH TITLES

Dr. John R. Bend, Head, Comparative Pharmacology and Physiology Section, Laboratory of Pharmacology, National Institute of Environmental Health Sciences.

1. Xenobiotic metabolism, accumulation and excretion in selected marine species.
2. Reconstitution of the microsomal mixed-function oxidase system from selected marine species.
3. The hepatic monoxygenase system of the winter flounder.

Dr. Klaus W. Beyenbach, Assistant Professor, Cornell University, Div. of Biological Sciences Physiology, College of Veterinary Medicine.

1. Transport of methylamine by isolated perfused renal tubules of the flounder.
2. Reliability of mammalian glomerular markers in studies of renal functions in fish.
3. Mechanism of Mg and fluid secretion by isolated perfused renal tubules of the flounder.

Dr. James L. Boyer, Professor of Medicine and Director, Liver Study Unit, Yale University School of Medicine.

1. Structure and functional correlations of the junctional complexes (tight junctions) in the rectal gland of the dogfish shark after cytochalasin.

Dr. J. Roy Chowdhury, Assistant Professor of Medicine, Albert Einstein College of Medicine.

1. Bilirubin metabolism in fish.

Dr. Gary W. Conrad, Professor, Division of Biology, Kansas State University

1. Control of cytokinesis and polor lobe formation in fertilized eggs of Ilyanassa obsoleta.

Dr. Richard Crawford, Professor and Chairman of Biology, Trinity College

1. Effects of drilling fluids on embryo development.
2. Aromatic amino acid hydroxylation in Fundulus embryos.

Dr. Helen F. Cserr, Associate Professor, Physiology and Biophysics, Brown University

1. Pathways and mechanisms of exchange between cerebrospinal fluid, extradural fluid and brain in the little skate, Raja erinacea.

Dr. David Dawson, Associate Professor, Department of Physiology and Biophysics, University of Iowa

1. Urinary bladder of winter flounder: functional isolation of basolateral membrane.
2. Ion transport and electrical properties of shark rectal gland.

Dr. Arthur L. DeVries, Associate Professor of Physiology at Department of Physiology and Biophysics, University of Illinois.

1. Renal handling of antifreeze peptides in coastal fishes in Maine.

Dr. Charles E. Dinsmore, Assistant Professor, Department of Anatomy, Rush University, Course Director, Histology Program.

1. The effect of acetazolamide and related carbonic anhydrase-inhibitors on limb regeneration in urodele amphibians.
2. The morphogenetic influence of grafted tail skin on urodele limb regeneration.

Dr. William L. Doyle, Professor Emeritus of Anatomy, University of Chicago.

1. Cytology in re saline secretion, gill, rectal gland.

Dr. William R. Driedzic, Assistant Professor of Biology, Mount Allison University.

1. Metabolic and mechanical differences between red and white fish hearts

Dr. Franklin Epstein, Professor of Medicine, Harvard Medical School.

1. Anion dependence of transport in avian nasal gland.
2. Oubain binding as a measure of Na-K-ATPase activity in the gills of Anguilla rostrata during the freshwater turnoff phenomenon.
3. Effects of analogs of furosemide on ion transport and membrane permeability in shark rectal gland.

Dr. David Erlij, Professor of Physiology, State University of New York, Downstate Medical Center.

1. Role of adenine analogues in the regulation of salt and water secretion by the rectal gland of the dogfish.

Dr. David H. Evans, Professor and Chairman of Biology, University of Miami.

1. Mechanisms of NaCl extrusion by the isolated, perfused head of the sculpin, Myoxocephalus octodecimspinosus.
2. Acid extrusion mechanisms by dogfish "pups" and hagfish.

Dr. Michael Field, Professor, Departments of Medicine and Pharmacological and Physiological Sciences, University of Chicago

1. Regulation of active chloride absorption in flounder intestine by extracellular pH.
2. K^+ transport in flounder intestine.
3. Determination of SO_4 and/or bile salt transport in flounder intestine.

Dr. John N. Forrest, Associate Professor of Medicine, Yale University School of Medicine

1. Permeability and structure of tight junctions in the dogfish rectal gland.
2. Electrical properties of mounted flat sheets of the dogfish rectal gland.
3. Role of calcium and adenosine and guanine nucleotides in the regulation of ion transport in the dogfish rectal gland.

Dr. Roy P. Forster, Ira Allen Eastman Professor, of Physiology, Emeritus, Dartmouth College.

1. Relative permeabilities of the endocardial and epicardial faces in the hearts in various marine fishes, especially elasmobranchs.
2. Origin and composition of pericardial fluid in sharks and rays.

Dr. Raymond Frizzell, Associate Professor of Physiology, University of Texas Medical School at Houston

1. Electrophysiology of shark rectal gland.
2. Effects of low pH and cyclic AMP on ion transport by flounder intestine
3. Potassium transport across flounder intestine: the effects of low pH and cyclic AMP.

Dr. Leon Goldstein, Chairman, Section of Physiology and Biophysics, Brown University.

1. Acid excretion by fish renal tubules.

Dr. Paul Greengard, Professor of Pharmacology and Psychiatry, Yale School of Medicine.

Visiting Scientist

Dr. C. Adrian Hogben, Professor of Physiology and Biophysics, University of Iowa

1. Net proton secretion by gastric mucosa as a function of transepithelial electrochemical potential difference.

Dr. Barbara Kent, Associate Professor of Physiology, Mt. Sinai School of Medicine.

1. Blood flow in the gill of S. acanthias.
2. Blood flow patterns in the control and theophylline stimulated rectal gland
3. Gill blood flow in fresh and salt water adapted eels.
4. Uterine gas exchange characteristics in dogfish.
5. Mechanical effects and oxygen consumption in isolated perfused fish hearts.

Dr. George W. Kidder, III, Professor of Physiology, University of Maryland School of Dentistry

1. Energetics of gastric acid secretion in dogfish.

Dr. Arnost Kleinzeller, Professor of Physiology, University of Pennsylvania

1. Transport of sugars in the flounder intestinal mucosa and associated electrical phenomena.
2. Transport of methylamine and 2-deoxy-D-galactose perfused tubules of the flounder kidney.
3. Cell volume control in slices of the rectal gland.

Dr. Thomas Maren, Graduate Research Professor of Pharmacology and Therapeutics
University of Florida School of Medicine

1. The effect of acetazolamide and related carbonic anhydrase inhibitors on limb regeneration in salamanders.
2. Further studies on comparative physiology of the carbonic anhydrase system.

Dr. Sandra K. Masur, Assistant Professor of Physiology and Biophysics, Mt. Sinai School of Medicine

1. Association of bulk membrane movement with antidiuretic hormone-induced changes in water permeability in the granular cells of the toad urinary bladder.

Dr. David S Miller, Research Scientist, Mount Desert Island Biological Laboratory, Salsbury Cove.

1. Environmental pollutants and membrane toxicity.
2. Pollutant toxicity in seabirds.

Dr. Martin Morad, Professor of Physiology, University of Pennsylvania

1. Voltage clamping dogfish heart using two microelectrode technique
2. Measurements of ionic conductances and $Na-K^+$ pump in the single-layered heart of the sea potato

Dr. H.V. Murdaugh, Jr., Professor of Medicine, University of South Carolina School of Medicine

1. Humoral adaptation of the dogfish to a dilute environment.
2. Biosynthesis of 1-hydroxycorticosterone by interrenal gland.
3. Factors effecting rectal gland function.

Dr. David F. Opdyke, Professor of Physiology, CMDNJ-New Jersey Medical School

1. Mechanism of catecholamine release in vertebrates.
2. Evolution of angiotensin II receptors in traget organs of lower vertebrates.

Dr. David Peakall, Chief, Wildlife Toxicology Division, Canadian Wildlife Service

1. Effects of combinations of pollutants of young seabirds.
2. Effects of oil on reproductive success of Leach's petrels.

Dr. Raymond Rappaport, Professor of Developmental Biology, Union College

1. Experimental analysis of animal cell division.

Dr. Bodil Schmidt-Nielsen, Research Scientist, Mount Desert Island Biological Laboratory, Salsbury Cove.

1. The comparative study of water transport in kidneys of crabs, oligochaetes and elasmobranchs.
2. The effect of neurosecretion on volume regulation in itnertidal worms.
3. Function of renal pelvis and its effect upon the concentrating ability of the kidney and collecting duct function.

Dr. Bruce D. Sidell, Assistant Professor of Zoology, University of Maine

1. Physiology and ultrastructure of the hagfish heart.

Dr. Patricio Silva, Associate Professor of Medicine, Harvard Medical School.

1. Mechanism of chloride transport by the dogfish rectal gland.

Dr. Jeffrey S. Staff, Assistant Professor of Medicine, Harvard Medical School

1. Role of prostoglandins in rectal gland secretion.
2. Vasoactive intestinal peptide studies in the intact shark.

Dr. Peter Woodhead, Professor, Marine Sciences Research Center, SUNY at Stony Brook

1. Basic biological data on ages, growth, maturation and fecundity of spiny dogfish.

Dr. Jose Zadunaisky, Professor of Physiology and Biophysics and Professor of Experimental Ophthalmology, New York University Medical Center

1. Studies in pardaxin-secretion of Pardachirus marmoratus.
2. Water movements across isolated ocular and transporting epithelia.
3. Sodium movements across isolated rectal gland of the dogfish.