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EDUCATION

B. Sc., Zoology, Andhra University, Visakhapatnam, India, 1958.
M. Sc., Zoology, Andhra University, Visakhapatnam, India, 1961.
Ph.D., Zoology, (Physiology), Andhra University, Visakhapatnam, India, 1967.
M. Sc., Dissertation: Studies on the species of *Thrissocles* (Pisces) off Waltair Coast.
Ph.D., Thesis: Studies on the physiology of color changes in the crab, *Ocypode macrocera*. (Board of Examiners: Sir Francis G.W. Knowles, F.R.S., Prof. E.J.W. Barrington, F.R.S., and Prof. P.M. Jenkins).

PROFESSIONAL POSITIONS

Instructor in Biology, A.C. College, Guntur, 1958-1959.
Instructor in Zoology, Andhra University, Visakhapatnam, 1961-1962.
Government of India Research Training Fellow, Andhra University, Visakhapatnam, 1962-1965.
Post-Doctoral Research Associate, Dept. Biology, Tulane University, New Orleans, 1966-1972.
Assistant Professor of Biology, University of West Florida, 1972-1975.
Associate Professor of Biology, University of West Florida, 1975-1978.
Professor of Biology, University of West Florida, 1978.
University Research Professor, University of West Florida, 1986.
Dean, College of Science and Technology, University of West Florida, 1995-1999
Director, Center for Environmental Diagnostics and Bioremediation, University of West Florida, 1990 – 2007.
University Research Professor Emeritus

RESEARCH INTERESTS

Comparative physiology, endocrinology, and pharmacology; Environmental physiology and Toxicology.

Chemistry, structure-activity relations, and immunodetection of pigment dispersing hormones; comparative biochemistry and physiology of arthropod neuropeptides.

MEMBERSHIP IN PROFESSIONAL SOCIETIES

American Association for Advancement of Science
American Society of Zoologists
Crustacean Society
International Pigment Cell Society
Sigma XI

AWARDS AND HONORS

University of West Florida - Distinguished Research Award, 1977
Fellow, American Association for Advancement of Science, 1985
University of West Florida - University Research Professor, 1986

RESEARCH GRANTS

Asia Foundation Grant in aid of Research (Awarded by the American Institute of Biological Sciences), 1967.

University of West Florida Research Council, "Endocrine Control of Color Changes in Crustaceans," (\$987), 1973-1974.

Ford Foundation Venture Funds, University of West Florida, "Undergraduate Research Participation in Experimental Biology and Chemistry of Marine Natural Products," (\$6,000). 1973-1974.

National Science Foundation Grant, "Undergraduate Research Participation," (\$10,000), 1974-1975.

University of West Florida Research Council, Summer Faculty Research Scholarship, "Crustacean Color Changes Induced by Drug-Hormone Interactions," 1974.

Division of Sponsored Research and Training, Gamma College, "Endocrine Control of Color Changes in Isopods," (\$300), 1974.

National Science Foundation Grant, "Undergraduate Research Participation," (\$10,000), 1975-1976.

Bionomics Marine Laboratory, "A Comparative Toxicity Study of Several Cogeneric Species to Three Environmental Contaminants," (\$2,730), 1976.

Environmental Protection Agency, "Toxic, Sublethal and Latent Effects of Selected Petroleum Hydrocarbons and Barium Sulfate on Marine Organisms," (\$410,660), 1976-1980.

Environmental Protection Agency, "Toxic and Sublethal Effects of Waste Drilling Muds and Certain Chromium Compounds on Crustaceans" (\$262,437), 1980-1984.

- National Science Foundation, "Symposium on Chromatophores and Color Changes" held at 1981 ASZ meeting, (\$5,000), 1981-1982.
- Environmental Protection Agency, "Workshop on Biorational Pesticides" (\$35,000), 1982-1983.
- National Science Foundation, "Structure-Function Analysis of a Light-Adapting/Pigment-Dispersing Crustacean Neurohormone," (\$255,000), 1984-1987.
- National Science Foundation, "Crustacean Pigment-Dispersing Hormones: Heterogeneity, Actions, and Distribution," (\$249,000), 1987-1991.
- Peptide Design, Maryland, "Isolation of PCP-agonist Peptides from Rat Brain," (\$25,000), 1988-1990.
- State of New Jersey, Department of Environmental Protection, Collaborative project with Rutgers University, "Immunological Assessment of Dioxin Impact on Neuroendocrine and Reproductive Physiology of the Blue crab, *Callinectes sapidus*," (\$55,940), 1989-1991.
- Environmental Protection Agency, "Development of Bioindicators to Assess Environmental Health," (\$325,000), 1990-1993.
- Environmental Protection Agency, "Bioremediation Research Program," (\$427,066), 1990-1994.
- Environmental Protection Agency, "EPA-UWF Cooperative Honors Program," (\$100,000), 1990-1994.
- Electric Power Research Institute, "Bioremediation of Mercury Contaminated Sites," (\$155,886), 1991-1994.
- Environmental Protection Agency, "Development and Application of Protocols for Evaluation of Oil Spill Bioremediation Agents," (\$855,432), 1991-1995.
- Environmental Protection Agency, "Effectiveness and Safety of Strategies for Oil Spill Bioremediation: Potential and Limitation, Laboratory to Field," (\$658,171), 1993-1997.
- Environmental Protection Agency, "Science Training in Ecology Program," (\$1,044,087), 1998-2001.
- Centers for Disease Control (CDC), "Environmental Health Studies in Escambia and Santa Rosa Counties, Florida," (\$832,233), 2002-2004.
- Environmental Protection Agency, "Assessment of Environmental Pollution and Community Health in Northwest Florida" (\$3,055,675), 2002-2009.

Centers for Disease Control (CDC), "PERCH Project: Environmental Health Studies in Northwest Florida," (\$198,400), 2005-2007.

PUBLICATIONS

Book:

Rao, K.R. (ed.), Pentachlorophenol: Chemistry, Pharmacology and Environmental Toxicology. 402 pp., Plenum Press, New York (1978).

Articles

Rao, K.R. The composition of egg capsules of the pulmonate land snail, *Ariophanta ligulata* (Ferussac). *Curr. Sci.*, 32:213-214 (1963).

Rao, K.R. The polysaccharides of the reproductive system of the land snail, *Ariophanta ligulata* in the formation of egg capsules. *J. Anim. Morphol. Physiol.*, 10:158-163 (1963).

Nagabhushanam, R., and K.R. Rao. The responses of the black chromatophores of the prawn, *Metapenaeus monoceros* to light and temperature. *J. Anim. Morphol. Physiol.*, 11:158-163 (1963).

Nagabhushanam, R., and K.R. Rao. The comparative physiology of crustacean pigmentary effectors XIII: The dual control of white chromatophores in the crab, *Ocypode platytarsis*. *Amer. Zool.*, 4:422 (1964).

Nagabhushanam, R., and K.R. Rao. Studies on the moult cycle of the crab, *Ocypode macrocera*. *Proc. Symp. Crustacea, Marine Biol. Ass., India* (1965).

Rao, K.R. Isolation and partial characterization of the moult-inhibiting hormone of the crustacean eyestalk. *Experientia*, 21:593 (1965).

Rao, K.R. Studies on the influence of environmental factors on growth in the crab, *Ocypode macrocera*, H. Milne Edwards. *Crustaceana*, 11:257-276 (1966).

Rao, K.R. A comparative study of chromatic adaptation and chromatophorotropins in brachyuran Crustacea. *Naturwissenschaften*, 54:26 (1967).

Rao, K.R. Responses of the crustacean larval chromatophores to light and endocrines. *Experientia*, 23:231 (1967).

Rao, K.R. Studies on the differentiation of crustacean chromatophorotropins. *J. Anim. Morphol. Physiol.*, 14:152 (1967).

- Rao, K.R., C.K. Bartell and M. Fingerman. Relationship between the response of melanophores in the fiddler crab, *Uca pugilator*, and the concentration of eyestalkextract. *Z. Vergl. Physiol.*, 56:232-236 (1967).
- Rao, K.R., and R. Nagabhushanam. The responses of the white chromatophores of the crab, *Uca annulipes* (H. Milne Edwards), to light and temperature. *Crustaceana*, 13:155-160 (1967).
- Nagabhushanam, R., and K.R. Rao. The endocrine control of white chromatophores in the crab, *Uca annulipes* (H. Milne Edwards). *Crustaceana*, 13:292-298 (1967).
- Rao, K.R. Studies on the differentiation of chromatophorotropins of the crab, *Ocypode macrocera*, H. Milne Edwards. *Physiol. Zool.*, 40:361-370 (1967).
- Fingerman, M., K.R. Rao, and C.K. Bartell. Is there a physiological limit to the response of melanophores in *Uca* to the melanin-dispersing hormone? *Biol Bull.*, 133:448 (1967).
- Rao, K.R., M. Fingerman and C.K. Bartell. Hormones controlling the white chromatophores of the fiddler crab, *Uca pugilator*. *Biol. Bull.*, 133:448-449 (1967).
- Bartell, C.K., K.R. Rao, and M. Fingerman. An analysis of the melanin-dispersing activity of aqueous and alcoholic extracts of eyestalks from the fiddler crab, *Uca pugilator*, by means of gel filtration and ultra-centrifugation. *Biol. Bull.*, 133:458 (1967).
- Rao, K.R., C.K. Bartell, and M. Fingerman. Effect of organic solvents on the melanin-dispersing activity of eyestalks from the fiddler crab, *Uca pugilator*. *Biol. Bull.*, 133:479-480 (1967).
- Fingerman, M., K.R. Rao, and C.K. Bartell. A proposed uniform method of reporting response values for crustacean chromatophorotropins: the Standard Integrated Response. *Experientia*, 23:962 (1967).
- Rao, K.R. The pericardial sacs of *Ocypode* with relation to water conservation, molting and behavior. *Amer. Zool.*, 7:768 (1967).
- Rao, K.R., M. Fingerman and C.K. Bartell. Physiology of the white chromatophores in the fiddler crab, *Uca pugilator*. *Biol. Bull.*, 133:606-617 (1967).
- Rao, K.R., Studies on the mechanism of response of the chromatosomes of the crab, *Ocypode macrocera* to chromatophorotropins. *Zool. Jb. Physiol.*, 73:321-335 (1967).
- Rao, K.R. Chromatophorotropins in the nerve ring and optic tentacles of the pulmonate

- gastropod, *Oncidium verraculatum*. Proc. Symp. Mollusca, Abstr., 48-49, Marine Biol. Ass. India (1968).
- Rao, K.R. Studies on the rhythms of pigment migration in the chromatosomes of the crab, *Ocypode macrocera*. *Broteria, Ser., Ciencias Naturais*, 37:3-12 (1968).
- Rao, K.R. Chromatophorotropic activities of the aqueous extracts of the different portions of the nervous system of the crab, *Ocypode macrocera*. *Broteria, Ser., Ciencias Naturais*, 37:59-70 (1968).
- Rao, K.R., C.K. Bartell, and M. Fingerman. Solubility and stability properties of the melanin-dispersing substances from the eyestalks of the fiddler crab, *Uca pugilator*. *Z. Vergl. Physiol.*, 60:1-13 (1968).
- Rao, K.R. Chromatophorotropins in the eyestalk and brain of the hermit crab, *Diogenes bicristimanus*. *Curr. Sci.*, 37:498 (1968).
- Rao, K.R. Pericardial sacs of *Ocypode* with relation to conservation of water, molting and behavior. *Amer. Zool.* 8:561-567 (1968).
- Rao, K.R., and M. Fingerman. Local variations of pigmentary patterns and chromatophoric responses of the fiddler crab, *Uca pugilator*. *Biol. Bull.*, 135:408 (1968).
- Rao, K.R., and M. Fingerman, A comparative analysis of the control of the white chromatophores in the fiddler crab, *Uca pugilator*, from Woods Hole, Massachusetts, and Panacea, Florida. *Biol. Bull.*, 135:432 (1968).
- Rao, K.R. Variations in the chromatophorotropins and adaptive colour changes during the life history of the crab, *Ocypode macrocera*. *Zool. Jb. Physiol.*, 74:274-291 (1968).
- Fingerman, M., and K.R. Rao. A comparative study of the action of extracts of the eyestalks from *Uca pugilator* and *Palaemonetes vulgaris* on the white chromatophores of the crab, *Uca pugilator*. *Amer. Zool.* 8:756-757 (1968).
- Rao, K.R., and M. Fingerman. Dimorphic variants of the fiddler crab, *Uca pugilator* and their chromatophore responses. *Proc. Louisiana Acad. Sci.*, 31:27-39 (1968).
- Rao, K.R. Influence of prolonged adaptation to a background upon the chromatophorotropins and physiological responses of the chromatophores in the crab, *Ocypode macrocera*. *Gen. Comp. Endocrinol.*, 12:574-585 (1969).
- Fingerman, M., and K.R. Rao. Physiology of the brown-black chromatophores of the stomatopod crustacean, *Squilla empusa*. *Physiol. Zool.*, 43:138-147 (1969).

- Rao, K.R., and M. Fingerman. The influence of size on the response of melanophores in the fiddler crab, *Uca pugilator*. *Z. Verg. Physiol.*, 62:86-92 (1969).
- Fingerman, M., and K.R. Rao. Restoration of a rhythm of melanophoric pigment dispersion in eyestalkless fiddler crab, *Uca pugilator*, at a low temperature. *Crustaceana*, 17:97-105 (1969).
- Fingerman, M., and K.R. Rao. A comparative study of the leucophore-activating substances from the eyestalks of two crustaceans, *Palaemonetes vulgaris* and *Uca Pugilator*. *Biol. Bull.*, 136:200-215 (1969).
- Rao, K.R. The effects of temperature on the responses of chromatophores in the crab, *Ocypode macrocera*. *Z. Vergl. Physiol.*, 65:233-241 (1969).
- Rao, K.R., and M. Fingerman. Action of biogenic amines on crustacean chromatophores: I. Differential effect of certain indolealkylamines on the melanophores of the crabs, *Uca pugilator* and *Carcinus maenas*. *Experientia*, 26:383-384 (1970).
- Rao, K.R., and M. Fingerman. Action of biogenic amines on crustacean chromatophores. II. Analysis of the responses of erythrochromes in the fiddler crab, *Uca pugilator*, to indolealkylamines and an eyestalk hormone. *Comp. Gen. Pharmacol.*, 1:117-126 (1970).
- Rao, K.R., and M. Fingerman. Chromatophorotropic activity of extracts of radial nerves from the starfish, *Asterias amurensis*. *Z. Vergl. Physiol.*, 62:133-128 (1970).
- Rao, K.R. Studies on the chromatophorotropic principles in the nerve ring and optic tentacles of the pulmonate gastropod, *Oncidium verraculatum*. *Proc. International Symposium on Mollusca*, Parts 2 & 3: 607-615 (1970).
- Fingerman, M., and K.R. Rao. Action of biogenic amines on crustacean chromatophores, III. Antagonism by LSD of the effect of 5-HT on color changes in the fiddler crab, *Uca pugilator*. *Comp. Gen. Pharmacology*, 1:341-348 (1970).
- Fingerman, M., and K.R. Rao. Analysis of the color changes evoked by serotonin and LSD in the fiddler crab, *Uca pugilator*. *Biol. Bull.*, 139:407 (1970).
- Rao, K.R., D.R. Fielder, and M. Fingerman. Isolation and purification of the melanin-dispersing substances in the eyestalks of the fiddler crab, *Uca pugilator*. *Amer. Zool.*, 10:495 (1970).
- Rao, K.R., D.R. Fielder, and M. Fingerman. Effect of oxidation and reduction on the biological activity of the melanin-dispersing substances from the eyestalks of the crab, *Uca pugilator*. *Amer. Zool.*, 10:495-496 (1970).
- Bartell, C.K., K.R. Rao, and M. Fingerman. Comparison of the melanin-dispersing fractions in the extracts prepared initially in ethanol, saline or distilled water

- from the eyestalks of the fiddler crab, *Uca pugilator*. *Comp. Biochem. Physiol.*, 38A:17-36 (1971).
- Fielder, D.R., K.R. Rao, and M. Fingerman. A female-limited lipoprotein and the diversity of hemocyanin components in the dimorphic variants of the fiddler crab, *Uca pugilator*, as revealed by disc electrophoresis. *Comp. Biochem. Physiol.*, 39B:291-297 (1971).
- Fielder, D.R., K.R. Rao, and M. Fingerman. Control of retinal pigment migration in the fiddler crab, *Uca pugilator*. *Marine Biol.*, 9:219-223 (1971).
- Rao, K.R., M. Fingerman, and C. Hays. Effects of α -ecdysone and 20-hydroxyecdysone on limb regeneration and molting in the fiddler crab, *Uca pugilator*. *Amer. Zool.*, 11:106 (1971).
- Rao, K.R., M. Fingerman, and C. Hays. Comparison of the abilities of α -ecdysone and 20-hydroxyecdysone to induce precocious proecdysis and ecdysis in the fiddler crab, *Uca pugilator*. *Z. Vergl. Physiol.*, 76:270-284 (1972).
- Rao, K.R., C.J. Mohrherr, D. Reinschmidt and M. Fingerman. Proecdysial staging and associated events in the molt cycle of the crayfish, *Faxonella clypeata*. *Amer. Zool.* 12:690 (1972).
- Rao, K.R., S.W. Fingerman, and M. Fingerman. Effects of exogenous ecdysones on the molt cycles of fourth and fifth stage American lobsters, *Homarus americanus*. *Comp. Biochem. Physiol.*, 44A:1105-1120 (1973).
- Rao, K.R., and R.B. Hackett. Studies on the physiological specificity of a synthetic crustacean chromatophorotropin. *Amer. Zool.* 13:1276 (1973).
- Rao, K.R. Crustacean color changes induced by drug-hormone interactions. *Amer. Zool.* 14:1246 (1974).
- Rao, K.R., and M. Fingerman. Action of biogenic amines on crustacean chromatophores, IV. Analysis of the synergistic erythrophoric pigment dispersion evoked by 5-hydroxytryptamine and lysergic acid diethylamide in the dwarf crayfish, *Cambarellus shufeldti*. *Comp. Biochem. Physiol.*, 51C:53-58 (1975).
- Rao, K.R., and M. Fingerman. Color changes induced by certain indole alkaloids in the fiddler crab, *Uca*. *Comp. Biochem. Physiol.*, 51C:59-62 (1975).
- Rao, K.R., and M.J. Inkel Jr. Hormonal control of molting in ovigerous *Palaemonetes pugio*. *Florida Scientist*, 38, suppl. 1:10 (1975).
- Rao, K.R. Overviews on marine pollution in India. Proc. Intern. Symposium Marine Pollution Research, pp. 54-59, Center for Wetland Resources, Louisiana State University, Baton Rouge, Louisiana (1976).

- Hackett, R.B., and K.R. Rao. Endocrine control of color changes in the isopod crustacean *Ligia olfersii*. *Amer. Zool.*, 16:199 (1976).
- Rao, K.R., C.J. Mohrherr, D. Reinschmidt, and M. Fingerman. Gastrolith growth during proecdysis in the crayfish, *Faxonella clypeata*. *Crustaceana*, 32:256-265 (1977).
- Fox, F.R., and K.R. Rao. Properties of a calcium-activated ATPase of the blue crab, *Callinectes sapidus*. *Amer. Zool.*, 17:879 (1977).
- Rao, K.R. Effects of ecdysterone, inokosterone and eyestalk ablation on limb regeneration in the fiddler crab, *Uca pugilator*. *J. Exper. Zool.*, 203: 257-270 (1978).
- Cantelmo, F.R., and K.R. Rao. Effects of pentachlorophenol on the meiobenthic nematodes in an experimental system. In, "Pentachlorophenol: Chemistry, Pharmacology and Environmental Toxicology," pp. 165-174, Plenum Press, New York (1978).
- Conklin, P.J., and K.R. Rao. Toxicity of sodium pentachlorophenate to the grass shrimp, *Palaemonetes pugio*, in relation to the molt cycle. In, "Pentachlorophenol: Chemistry, Pharmacology and Environmental Toxicology," pp. 181-192, Plenum Press, New York (1978).
- Rao, K.R., P.J. Conklin, and A.C. Brannon. Inhibition of limb regeneration in the grass shrimp, *Palaemonetes pugio*, by sodium pentachlorophenate. In, "Pentachlorophenol: Chemistry, Pharmacology and Environmental Toxicology," pp. 193-203, Plenum Press, New York (1978).
- Doughtie, D.G., and K.R. Rao. Ultrastructural changes induced by sodium pentachlorophenate in the grass shrimp, *Palaemonetes pugio*, in relation to the molt cycle. In, "Pentachlorophenol: Chemistry, Pharmacology and Environmental Toxicology," pp. 213-250, Plenum Press, New York (1978).
- Cantelmo, A.C., P.J. Conklin, F.R. Fox, and K.R. Rao. Effects of sodium pentachlorophenate and 2,4-dinitrophenol on respiration in crustaceans. In, "Pentachlorophenol: Chemistry, Pharmacology and Environmental Toxicology," pp. 251-264, Plenum Press, New York (1978).
- Fox, F.R., and K.R. Rao. Effects of sodium pentachlorophenate on hepatopan-creatic enzymes in the blue crab, *Callinectes sapidus*. In, "Pentachlorophenol: Chemistry, Pharmacology and Environmental Toxicology", pp. 265-276, Plenum Press, New York (1978).
- Rao, K.R., and A.C. Brannon. Color changes induced by peptide derivatives of lysergic acid in the fiddler crab, *Uca panacea*. *Comp. Biochem. Physiol.*, 59C:97-100

- (1978).
- Cantelmo, F.R., and K.R. Rao. Effects of pentachlorophenol on the establishment of meiobenthic communities in an experimental system. *Marine Biol.*, 46:17-22 (1978).
- Fox, F.R., and K.R. Rao. Characteristics of a Ca activated ATPase from the hepatopancreas of the blue crab, *Callinectes sapidus*. *Comp. Biochem. Physiol.*, 59B: 327-331 (1978).
- Cantelmo, A.C., and K.R. Rao. The effects of pentachlorophenol (PCP) and 2, 4-dinitrophenol (DNP) on the oxygen consumption of tissues from the blue crab, *Callinectes sapidus*, under different osmotic conditions. *Comp. Biochem. Physiol.*, 60C:215-219 (1978).
- Conklin, P.J., and K.R. Rao. Toxicity of sodium pentachlorophenate to the grass shrimp, *Palaemonetes pugio*, at different stages of the molt cycle. *Bull. Env. Contam. Toxicol.*, 20:275-279 (1978).
- Doughtie, D.G., and K.R. Rao. Temporary ciliary structures in the branchial exocrine dermal glands of the grass shrimp, *Palaemonetes pugio*. *Amer. Zool.*, 18:633 (1978).
- Rao, K.R., F.R. Fox, P.J. Conklin, A.C. Cantelmo, and A.C. Brannon. Physiological and biochemical evaluation of the toxicity of pentachlorophenol to crustaceans. In, "Marine Pollution: Functional Responses," (W.B. Vernberg, F.R. Thurberg, A. Calabrese, and F.J. Vernberg, eds.) pp. 307-340. Academic Press, New York (1979).
- Brannon, A.C., and K.R. Rao. Barium, strontium and calcium levels in the exoskeleton, hepatopancreas and abdominal muscle of the grass shrimp, *Palaemonetes pugio*: relation to molting and exposure to barite. *Comp. Biochem. Physiol.* 63A:261-274 (1979).
- Doughtie, D.G., and K.R. Rao. Ultrastructure of an exocrine dermal gland in the gills of the grass shrimp, *Palaemonetes pugio*: occurrence of transitory ciliary axonemes associated with the sloughing and reformation of the ductule. *J. Morphol.*, 161: 281 - 308 (1979).
- Cantelmo, F.R., M.E. Tagatz, and K.R. Rao. Effects of barite on meiofauna in an experimental flow-through system. *Mar. Environ. Res.*, 2:301-310 (1979).
- Doughtie, D.G., and K.R. Rao. Comparative ultrastructure of three types of tegumental glands in the gills of the grass shrimp, *Palaemonetes pugio*. *Amer. Zool.*, 19:890 (1979).
- Quackenbush, L.S., and K.R. Rao. Effects of cyclic nucleotides and A23187 on the

- chromatophores of the fiddler crab, *Uca pugilator*. *Amer. Zool.* 19:917 (1979).
- Conklin, P.J., D.G. Doughtie, and K.R. Rao. Effects of barite and used drilling muds on crustaceans, with particular reference to the grass shrimp, *Palaemonetes pugio*. In, "Proceedings of the Symposium: Research on Environmental Fate and Effects of Drilling Fluids and Cuttings," vol. 2:912-943, Courtesy Associates, Washington, D.C. (1980).
- Landau, M., and K.R. Rao. Toxic and sublethal effects of precocene II on the early developmental stages of the brine shrimp, *Artemia salina* (L.) and the barnacle, *Balanus eburneus* Gould. *Crustaceana*, 39:218-221 (1980).
- Doughtie, D.G., and K.R. Rao. The syncytial nature and phagocytic activity of the branchial podocytes in the grass shrimp, *Palaemonetes pugio*. *Tissue and Cell*, 13:93-104 (1981).
- Doughtie, D.G., and K.R. Rao. Ciliary structures in the branchial unicellular glands of the grass shrimp, *Palaemonetes pugio*. *Experientia*, 37:502-503 (1981).
- Rao, K.R., F.R. Fox, P.J. Conklin and A.C. Cantelmo. Comparative toxicology and pharmacology of chlorophenols: studies on the grass shrimp, *Palaemonetes pugio*. In, "Biological Monitoring of Marine Pollutants," (J. Vernberg, A. Calabrese, F.P. Thurberg, and W.B. Vernberg, eds.), pp. 37-72. Academic Press, New York (1981).
- Powers, E.A., and K.R. Rao. An *in vitro* culture of guppy chromatophores. *Amer. Zool.*, 21:1010 (1981).
- Ray, M.J., K.R. Rao, and J.P. Riehm. Digestive enzymes of the horseshoe crab, *Limulus polyphemus*. *Amer. Zool.*, 21:1028 (1981).
- Doughtie, D.G., and K.R. Rao. Rosette glands in the gills of the grass shrimp, *Palaemonetes pugio*. I. Comparative morphology, cyclical activity and innervation. *J. Morphol.*, 171:41-67 (1982).
- Doughtie, D.G. and K.R. Rao. Rosette glands in the gills of the grass shrimp, *Palaemonetes pugio*. II. Premolt ductule reformation: replacement of ciliary processes by cytoplasmic processes in relation to gland maturation. *J. Morphol.*, 171:69-77 (1982).
- Conklin, P.J., and K.R. Rao. Effects of two dithiocarbamates on the grass shrimp, *Palaemonetes pugio*: molt-related toxicity and inhibition of limb regeneration. *Arch. Environ. Contam. Toxicol.*, 11:431-435 (1982).
- Riehm, J.P., and K.R. Rao. Structure-activity relationships of a pigment-dispersing crustacean neurohormone. *Peptides*, 3:643-647 (1982).
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- benzo(a)pyrene and benzo(a)anthracene in the grass shrimp, *Palaemonetes pugio*. In, "Proceedings of the Symposium: Carcinogens in the Marine Environment," pp. 336-349. EPA-600/9-82-013 (1982).
- Rao, K.R., D.G. Doughtie, and P.J. Conklin. Physiological and histopathological evaluation of dithiocarbamate toxicity to the grass shrimp, *Palaemonetes pugio*. In, "Pollution and Physiology of Marine Organisms" (W.B. Vernberg, A. Calabrese, F.P. Thurberg, and F.J. Vernberg, eds.), pp. 413-445, Academic Press, New York (1982).
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PROFESSIONAL MEETINGS ATTENDED (* = Paper presented; I = Invited speaker; C = Session chairman)

- 1964 (*) Symposium on Crustacean Biology, Porto-Novo, India.
 1965 (*) International Symposium on Crustacea, Cochin, India.
 1966 (*) Symposium on Comparative Endocrinology, Trivandrum, India.
 1967 (*) Tuesday Evening Seminars, Marine Biological Laboratory, Woods Hole, MA.
 1967 (*) Annual Meeting, Marine Biological Laboratory, Woods Hole, MA.
 1967 (I) International Symposium on Terrestrial Adaptations in Crustacea, New

- York, NY.
- 1968 (I) International Symposium on Mollusca, Cochin, India.
- 1968 (*) Tuesday Evening Seminar, Marine Biological Laboratory, Woods Hole, MA.
- 1968 (*) Annual Meeting, Marine Biological Laboratory, Woods Hole, MA.
- 1968 (*) American Association for Advancement of Science, Dallas, Texas.
- 1968 (*) Louisiana Academy of Sciences, New Orleans, Louisiana.
- 1970 (*) American Association for Advancement of Science, Chicago, Illinois.
- 1971 (*) American Association for Advancement of Science, Philadelphia, PA.
- 1972 (*) American Association for Advancement of Science, Washington, D.C.
- 1973 (*) American Society of Zoologists, Houston, Texas.
- 1974 (*) American Society of Zoologists, Tuscon, Arizona.
- 1975 (*) Florida Academy of Sciences, Lakeland.
- 1976 (*) American Society of Zoologists, New Orleans, Louisiana.
- 1977 (I) International Symposium on Marine Pollution Research, Gulf Breeze, FL.
- 1977 (*C) International Symposium on Pentachlorophenol, Gulf Breeze, Florida.
- 1977 (*) Xth International Pigment Cell Conference, Cambridge, Massachusetts.
- 1977 (*) International Symposium on Pollution and Physiology of Marine Organisms, Georgetown, South Carolina.
- 1977 (*) American Society of Zoologists, Toronto, Canada.
- 1978 (I) International Symposium on Carcinogens in the Marine Environment, Gulf Breeze, Florida.
- 1978 American Society of Testing Methods, New Orleans, Louisiana.
- 1978 (*) American Society of Zoologists, Richmond.
- 1979 (*) American Society of Zoologists, Chicago, Illinois.
- 1979 (I) International Symposium on Biological Monitoring of Marine Pollution, Milford, Connecticut.
- 1980 (I) Symposium on Environmental Fate and Effects of Drilling Fluids and Cuttings, Lake Buena Vista, Florida.
- 1981 (*) American Society of Zoologists, Dallas, Texas.
- 1981 (C) International Symposium on Chromatophores and Color Changes, Dallas, Texas.
- 1981 (I) International Symposium on Physiological Mechanisms of Marine Pollutant Toxicity, Columbia, South Carolina.
- 1982 (*) American Physiological Society, San Diego, California.
- 1982 (*) American Society of Zoologists, Louisville, Kentucky.
- 1982 National Academy of Sciences Panel Review on Drilling Muds, general meeting, Washington, D.C.
- 1982 (*) International Aquatic Toxicology Meetings, Edmonton, Canada.
- 1982 (I) Adaptive Environmental Assessment Workshop, Gulf Breeze, Florida.
- 1982 Symposium on Meaningful Measures of Marine Pollution, Gulf Breeze, FL.
- 1983 (I) International Symposium on Pollution and Physiology of Marine Animals, Mystic, Connecticut.
- 1983 (I) International Symposium on Marine Pollution, Woods Hole, MA.
- 1983 (*) Third International Symposium on HPLC of Proteins, Peptides, and Polynucleotides, Monte Carlo, Monaco.
- 1983 (*) American Society of Zoologists, Philadelphia, Pennsylvania.
- 1983 (C) International Symposium on Frontiers of Crustacean Endocrinology,

- Philadelphia, Pennsylvania.
- 1983 (*C) XIIth International Pigment Cell Conference, Giessen, West Germany.
- 1984 (I) Indo-U.S. Conference on the Biology of Benthic Marine Invertebrates, Aurangabad, India.
- 1984 (*) American Society of Zoologists, Denver, Colorado.
- 1985 (I) Conference on Protein Structure and Function, Lorne, Australia.
- 1985 (I) 10th International Symposium on Comparative Endocrinology, Copper Mountain, Colorado.
- 1985 (*C) American Society of Zoologists, Baltimore, Maryland.
- 1986 (I) Indo-U.S. Conference on Marine Biodeterioration. Goa, India.
- 1986 (I) International Pigment Cell Conference, Tucson, Arizona.
- 1986 Satellite Symposium on Melanotropins, Tucson, Arizona.
- 1986 (*) Society of Neuroscience, Washington, D.C.
- 1986 (*C) American Society of Zoologists, Nashville, Tennessee
- 1987 (I) Winter Neuropeptide Conference, Breckenridge, Colorado.
- 1987 (*) Society of Neuroscience, New Orleans, Louisiana.
- 1987 (*) American Society of Zoologists, New Orleans, Louisiana.
- 1988 (I) Symposium on Frontiers of Shrimp Research, Washington, D.C.
- 1988 (I) Symposium on Consistency and Variability in Peptide Families. 2nd International congress of Comparative Biochemistry and Physiology. Baton Rouge, LA.
- 1988 (*) Society of Neuroscience, Toronto, Canada.
- 1989 (I) International Conference on Bioactive Substances from the Ocean, Goa, India.
- 1989 (I) International Symposium on Comparative Endocrinology, Malaga, Spain.
- 1989 (I) 5th International Symposium on Invertebrate Reproduction, Nagoya, Japan.
- 1989 (*) Society of Neuroscience, Phoenix, Arizona.
- 1989 (I) International Chemical Congress of the Pacific Basin Societies, Honolulu, Hawaii.
- 1989 (*) American Society of Zoologists, Boston, Massachusetts.
- 1990 (IC) XIVth International Pigment cell conference, Kobe, Japan.
- 1990 (*) American Society of Zoologists, San Antonio, Texas.
- 1991 (IC) International Marine Biotechnology Conference, Baltimore, Maryland.
- 1991 (I) American Society of Zoologists, Atlanta, Georgia
- 1992 (I) Symposium on Melanotropic Peptides, New York Academy of Sciences, Rouen, France.
- 1993 American Society of Zoologists, Los Angeles, California
- 1994 Society of Neuroscience, Miami, Florida
- 1994 Higher Education Consortium, Tampa, Florida
- 1995 American Society of Zoologists, Washington, D.C.
- 1996 Engineering Deans Institute, West Palm Beach, Florida
- 1996 Institute for Academic Leadership, Workshop for Deans, State University System of Florida, Howey-in-the-Hills, Florida
- 1996(IC) XVIth International Pigment Cell Conference, Anaheim, California
- 1997 Society of Integrative and Comparative Biology, Boston, Massachusetts
- 1997 Engineering Deans Institute, San Antonio, Texas
- 1997 Institute for Academic Leadership, Workshop for Dean, State University

	System of Florida, Howey-in-the-Hills, Florida
1998	Engineering Deans Institute, San Juan, Puerto Rico
1998	Institute for Academic Leadership, Workshop for Deans, State University System of Florida, Howey-in-the-Hills, Florida
1999	Society of Neuroscience, Miami, Florida
2000(I)	Society for Integrative and Comparative Biology, Atlanta, Georgia
2000(*)	Society of Neuroscience, New Orleans, Louisiana
2000	National Role Models Conference, Washington, D.C.
2001(I)	NIH-ORMH Conference, Washington, D.C.
2001(*)	Society for Integrative and Comparative Biology, Chicago, Illinois
2002	Florida Marine Biotechnology Summit, Ft. Pierce, Florida
2002	New England Endocrinology Conference, Amherst, Massachusetts
2002(*)	Society for Integrative and Comparative Biology, Anaheim, California
2002	Federal Demonstration Partnership (FDP), Washington, D.C.
2003(I)	Inaugural Lecture; national Seminar on Modern Biology, Guntur, India
2003	Federal Demonstration Partnership (FDP), Irvine, California
2003	Society for Environmental Toxicology and Chemistry, Austin Texas
2004	Society for Integrative and Comparative Biology, New Orleans, Louisiana
2004	Federal Demonstration Partnership (FDP), Washington, DC.
2004	Federal Demonstration Partnership (FDP), Las Vegas, Nevada
2005(I)	Public Health Safe Water Conference, Orlando, Florida
2005	Federal Demonstration Partnership (FDP), Washington, D.C.
2006	Federal Demonstration Partnership (FDP), Washington, D.C.
2006	Federal Demonstration Partnership (FDP), Seattle, WA
2006	Florida Public Health Association, FLCURED Summit, West Palm Beach, FL
2006(*)	Society for Environmental Toxicology and Chemistry, Montreal, Canada

UNIVERSITY SERVICE

Department Level Committees & Service

Advisory Committee (1974-1978); Chairman (1974-1975)
 Directed Study Review Committee (1972-1973)
 Faculty Search Committee (1972-1976); Chairman (1975-1976)
 Graduate Program Committee (1978-1980)
 Preprofessional Committee (1982 -)
 Travel Committee (1972-1974; 1976-1980)
 Self-study Committee (1976-1977)
 Undergraduate Program Committee (1973-1978)
 Governance Committee (1988-1989)
 Advisory Committee (1989-1991)
 Biology Chair Search Committee (1989-1990)

College Level Committees & Service

Gamma College Curriculum Committee (1975-1976)
 Alpha College Curriculum Committee (1977-1978)
 Coastal Zone Advisory Committee (1981-1982)
 Preprofessional Advisory Committee (1982-)
 Radiological Screening Committee (1978-)
 Arts & Sciences Self Study Committee (1983-1984)
 Resource Allocation Committee (1990-1993)
 College of Business Faculty Search Committee (1999-2000)

University Level Committees & Service

Faculty Senate (1990-1993), Vice President (1991-1992), President (1992-1993)
 Strategic Planning Council (1991-1992)
 University Executive Council (1992-1993)
 Animal Care and Use Committee (1991-1993), Chairman (1991-1993)
 Support Services Review Committee, Chairman (1978-1979)
 Equal Opportunity Council (1975-1978)
 Faculty Council (1977-1980)
 University Role and Scope Committee (1978-1979)
 University Governance Committee, Chairman (1979-1980)
 Honorary Degrees Committee (1979-1982)
 Research Conditions Committee, Ad hoc (1983-1984)
 Faculty Personnel Committee (1976-1979) (1988-1991)
 Growth and Development Committee (1988-1990)
 Kobe Oversight Committee (1990-1995)
 University Publications Committee (1990-1993)
 Faculty Representative, Federal Demonstration Partnership (FDP), (2002-present)
 Chair, Search Committee, Assistant Controller, Office of Sponsored Research (2003-2004)
 Co-chair, Sponsored Research Advisory Committee (2004 -)
 Member, Search Committee, Associate Vice President for Research and Dean of Graduate Studies (2004-2005)
 Member, Search Committee, Director of Government Relations (2005)
 Member, Secretary, Board of Directors, University of West Florida Research Foundation (2005)

State University System Level Committees and Service

Faculty Advisory Forum (Committee of Faculty Senate Presidents of the State University System of Florida; advisory committee to the Chancellor); Vice Chair (1992-1993); Chair (1993-1994).
 Coordinator, Proposal development in the area of environmental research for the Technology Reinvestment Project, SUS Chancellor's Office (1993).

PROFESSIONAL SERVICE

Societies/Symposia

Co-organizer, Regional Conference in Comparative Endocrinology for the American Society of Zoologists, Pensacola, 1974.
 President, Sigma XI Club, University of West Florida (1975-1976).
 Recording Secretary, Southeastern Division, Sigma XI - National Assembly of Delegates, 1975.
 Organizer, International Symposium on Pentachlorophenol, Gulf Breeze, 1977.
 Treasurer and Recording Secretary, Crustacean Club, 1980-1981.
 Co-organizer, Symposium on Chromatophores and color changes, American Society of Zoologists, Dallas, 1981.
 Co-organizer, Workshop on Biorational Pesticides, Gulf Breeze, 1982.
 Organizer, Symposium on Color Changes in Invertebrates, for XIIIth International Pigment Cell Conference, Tucson, Arizona, 1986.
 Co-organizer, Workshop on Control of Pigmentation: Comparative Aspects, XIth International Symposium on Comparative Endocrinology, Malaga, Spain, 1989.
 Organizing Chairperson, Workshop on chromogenesis and chromatophore responses in Invertebrates, XIth International Pigment Cell Conference, Kobe, Japan, 1990.
 Co-Organizer, Symposium on Implications of Biotechnology for Shellfish Culture, International Marine Biotechnology Conference, Baltimore, 1991.
 Co-Organizing Chairperson, Workshop on Dynamics of Invertebrate Pigment Cells. XVIth International Pigment Cell Conference, Anaheim, California, 1996.

Talent Searches

Zoology Judge, International Science Fair, New Orleans, 1972.
 Biology Judge, Florida Junior Academy of Sciences, Pensacola, 1973.
 Biology Judge, Regional Science Fair, (1981-present)
 Member, Judging Committee, Aubrey Gorbman Award for best student paper in comparative endocrinology, American Society of Zoologists, 1986.
 Biology Judge, Florida Junior Academy of Sciences, Pensacola, 1987.
 Member, Judging Committee, Best Student Poster Awards, Comparative Physiology and Biochemistry, Society of Integrative and Comparative Biology, 1997.

Editorial Service

Associate Editor, Endocrinology, *Journal of Experimental Zoology*.
 Member, Editorial Board, *Pigment Cell Research*.
 Member, Editorial Board, *Biological Bulletin*, Marine Biological Laboratory, Woods Hole.

Reviewer

Journals such as: Archives of Environmental Contamination and Toxicology; Biological Bulletin; Biology of Reproduction; Cell and Tissue Research; Discovery and Innovation; General and Comparative Endocrinology; International Journal of Peptide and Protein Research, Invertebrate Reproduction and development; Journal of Comparative Physiology; Journal of Crustacean Biology; Journal of Experimental Zoology; Journal of Experimental Marine Biology and Ecology; Journal of Neuroscience; Marine Biology; Marine Environmental Research; Peptides; Physiology and Behavior; Pigment Cell Research; Science.

Grant Proposal Reviews for: Environmental Protection Agency and diverse programs of the National Science Foundation (Sensory Biology Program, Regulatory Biology Program, Environmental Biology Program, Systematics Program, Instrumentation Program, International Program).

Review Panel Member: Presidential Young Investigator Awards Program, Division of Cellular Biosciences, National Science Foundation.

Review Panel Member: Environmental Biology, national level competitive grants program, Environmental Protection Agency (1990-1994).

Review Panel Member: American Institute of Biological Sciences, national level competitive grants program for Marine Biotechnology Research Initiative of the National Sea Grant Program (1995).

Review Panel Member: Competitive grants program panels: Graduate Fellowships; grants for biology and microbiology; grants for research on Endocrine Disruptors; Environmental Protection Agency (1996).

Review Panel Member: Competitive grants program panels: grants for ecosystems and biology; grants for research on Endocrine Disruptors; Environmental Protection Agency (1997).

Review Panel Member: Competitive grants program panel: Estuarine Indicators; Environmental Protection Agency (2000).

Other Service

Special laboratory exercises for middle-school students in the PATS (Program for Academically Talented Students) Program. Arranged at the University each year (1978-1995).

Guest Instructor, Experimental Marine Biology Course taught at Florida State University Marine Laboratory. Taught a week-long intensive course in endocrinology during the years 1976-1980.

Special laboratory exercises for students in the International Baccalaureate Program, Pensacola High School Arranged at the University, 1988.

Special lectures for students in "Theory of Knowledge," International Baccalaureate Program, Pensacola High School, 1990.

Special lecture on Environmental Diagnostics and Bioremediation for "LEAP Education Day," 1992.

Graduate Program Reviewer and Guest Lecturer, University of Rio Grande, Brazil (2000).

Special lectures to regional organizations: e.g., Pensacola Chamber of Commerce; West Florida Regional Planning Council; Bay Area Resource Council, Escambia County Environmental Committee; Santa Rosa County Commission; City of Milton; Air Products Advisory Committee; Society of Environmental Professionals (2002-2005).