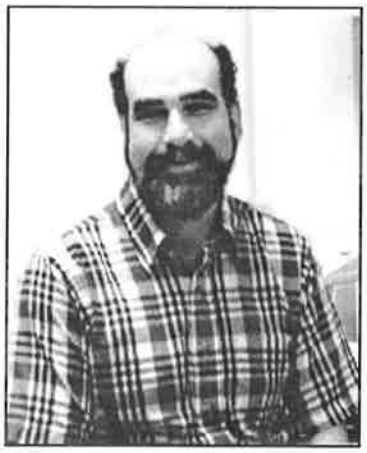

EVERETT D. BANDMAN
Professor and Biochemist

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Specialty | Education | Professional Experience | Research | Selected Publications

SPECIALTY:

- Muscle cell biology
- Muscle biochemistry
- Molecular biology

EDUCATION:

1969 B.S., Biology, City College of New York, NY
1974 Ph.D., Molecular Biology, University of California, Berkeley, CA

POSITIONS HELD:

Postdoctoral Fellow, Biochemistry, Harvard Medical School, Boston, MA, 1974-76
Research Fellow, Surgery, Massachusetts General Hospital, Boston, MA, 1974-76
Postdoctoral Fellow, Zoology, UC Berkeley, Berkeley, CA, 1976-78
Assistant Research Zoologist, Department of Zoology, UC Berkeley, Berkeley, CA 1977-81
Asst/Assoc/Professor and Biochemist, Department of Food Science and Technology, UC Davis, Davis, California, 1982 - present

RESEARCH OBJECTIVES - LAY TERMS

Myosin is the major protein in chicken muscle responsible for the functional properties of meat and meat products. In all agriculturally important species from which meat is derived, myosins are encoded by a family of highly homologous genes, known as a multigene family. Although the proteins produced by these genes are very similar, the genes are active during different phases of animal growth. The long term objective of my research program is to obtain information regarding the structure, organization, and regulation of the chicken myosin multigene family. The information generated by these studies will provide a greater understanding of the specific functional properties of meat and meat products containing different myosins, as well as manipulating the expression of specific myosin genes in order to enhance the efficiency of meat production in chickens.

RESEARCH OBJECTIVES - FOR PEERS

The long term goal of my research program is to understand the functional significance of myosin isoform diversity in developing chicken skeletal muscle. To achieve this goal on-going projects include determining the genomic organization of the myosin multigene family, characterization of the regulatory regions within these genes responsible for the differential expression of myosin isoforms in fast twitch and slow tonic developing muscles, identification of functional differences encoded by diverging

regions of each of the expressed myosin genes, and identification of functions encoded in highly conserved domains of the myosin molecule. In addition, my laboratory studies the cellular basis for the differential expression of myosin isoforms in heterogeneous myoblast lineages.

RECENT SIGNIFICANT FINDINGS/ACCOMPLISHMENTS

In recent publications we have shown that the myosin multigene family is evolving distinctly in birds as compared to mammals, with many myosin genes having recently appeared during avian evolution. Ongoing studies are aimed at identifying whether these genes encode functionally unique myosins or represent examples of genetic redundancy to maintain adequate amounts of myosin proteins during different stages of muscle growth. In comparing the amino acid sequence of 5 different myosin genes we demonstrated evidence for the process of gene conversion which effected the manner in which the multigene family is evolving. We have also demonstrated that there are domains in myosin which are undergoing rapid changes, while other regions have been highly conserved. We have hypothesized that isoform specific properties may lie within these divergent regions while critical properties of the myosin molecule are located in domains that have remained unaltered for hundreds of millions of years of evolution. In biological area we have shown that the specific pattern of myosin gene expression exhibited by a muscle cell is determined from the specific myoblast lineage from which that cell is derived. The implication of these results for animal growth and development is that it may be possible to direct muscles to contain specific types of myosins, which alter their functional properties not only in living organisms but during postmortem conversion of muscle to meat. In addition, understanding the functional properties of different myosin proteins can provide useful applications in meat processing which are determined by the functional properties of myosin, such as water holding capacity, protein binding, and actomyosin toughness.

SELECTED PUBLICATIONS:

- Analysis of the chicken fast myosin heavy chain family: Localization of isoform-specific antibody epitopes and regions of divergence. 1992. L.A. Moore, M.J. Arrizubieta, W.E. Tidyman, L.A. Herman and E. Bandman. Journal of Molecular Biology 225:1143-1151.
- Effects of anti-LMM antibodies on the solubility of chicken skeletal muscle myosin. M. Wick, F. Tablin and E. Bandman. 1996. Journal of Food Biochemistry 20:379-395.
- Expression of fast myosin heavy chain transcripts in developing and dystrophic chicken skeletal muscle. W.E. Tidyman, L.A. Moore and E. Bandman. 1997. Developmental Dynamics 2098:491-504.
- Regulation of alpha-helical coiled-coil dimerization in chicken skeletal muscle light meromyosin. Arrizubietea, M.J. and E. Bandman. 1999. Journal of Biological Chemistry 274:13847-13853.
- Solubility of myosin and the binding quality of meat products. Bandman, E. 1999. p.236-244, IN: A. Oktoni and A. Suzuki (eds.), 45th ICoMST Congress Proceedings, Japan Society for Meat Science and Technology, Japan.
- Myonuclear domain size varies along the lengths of maturing skeletal muscle fibers. B.W.C. Rosser, M.S. Dean and E. Bandman. 2002. International Journal of Developmental Biology 46:747-754.

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