

PRINCIPAL RESEARCH INTERESTS:

The role of subcellular elemental distributions in the function of cardiac muscle and secretory cell systems, as studied using analytical electron microscopy.

Development of electron probe devices, particularly high resolution scanning microscopes and associated analytical instrumentation.

Electron beam interactions and radiation damage as observed in the electron microscope.

SELECTED EXAMPLES OF EXTERNAL FUNDING:

Myocardial Cation Analysis using Electron Energy Loss Spectrometry NIH Research Career Development Award Principal Investigator: Dale E. Johnson Total Award	9/78 - 8/83	\$150,000
Energy Loss Microanalysis of Myocardial Cations (NIH Project Completed after Nine Years of Funding) Principal Investigator: Dale E. Johnson Total Award	7/77 - 12/86	\$273,114
Mechanisms of Contraction in Cardiac Muscle (NIH Program Project) Project VI: Myocardial Subcellular Calcium Distributions & Electron Microscope Core Project Director: Dale E. Johnson Total Award	4/84 - 3/89	\$606,808
Elemental Analysis of Labial Glands in Cystic Fibrosis-NIDR Co-Principal Investigator: Dale E. Johnson Total Award	8/85 - 7/89	\$640,000
Elemental Analysis of Labial Glands in Cystic Fibrosis-NIDR Co-Principal Investigator: Dale E. Johnson Total Award	8/85 - 7/89	\$640,000
Saliva Formation Studied by Microprobe Analysis-NIDR Co-Principal Investigator: Dale E. Johnson Total Award	3/83 - 8/89	\$532,580
Preparing Future Faculty - Pew Charitable Trusts Principal Investigator: Dale E. Johnson Project Director: Elizabeth Feetham Total Award	7/94 - 7/96	\$170,000

RESEARCH PUBLICATIONS:

1. Crewe, A.V., Isaacson, M. and Johnson, D.: A Simple Scanning Electron Microscope. Rev. Sci. Inst. 40:241-246, 1969.
2. Crewe, A.V., Isaacson, M. and Johnson, D.: Secondary Electron Detection in a Field Emission Scanning Microscope. Rev. Sci. Inst. 41:20-24, 1970.
3. Crewe, A.V., Isaacson, M., Johnson, D. and Smith, J.B.: Scanning Electron Microscopy of Lunar Spherules. Geochim. Cosmchim. Acta 34, 1970.
4. Isaacson, M., Johnson, D. and Sheffield, J.: Visualization of Surface Structures on Embryonic Cells. Exper. Cell Research 64:49-56, 1971.
5. Crewe, A.V., Isaacson, M. and Johnson, D.: A High Resolution Electron Spectrometer for Use in Transmission Scanning Electron Microscopy. Rev. Sci. Inst. 42:411-420, 1971.
6. Crewe, A.V., Isaacson, M. and Johnson, D.: Electron Energy Loss Spectra of the Nucleic Acid Bases. Nature 231:262-263, 1971.

7. Johnson, D.: The Interactions of 25 KeV Electrons with Guanine and Cytosine. *Radiation Research* 49:63-84, 1972.
8. Isaacson, M., Johnson, D. and Crewe, A.V.: Electron Beam Excitation and Damage of Biological Molecules: Its Implications for Specimen Damage in Electron Microscopy. *Radiation Research* 55:205-224, 1973.
9. Johnson, D. and Isaacson, M.: Cytosine Reflectance Measurements Using Electron Energy Loss Spectra and Synchrotron Radiation. *Optics Communications* 8:406-408, 1973
10. Isaacson, M. and Johnson, D.: Low Z Elemental Analysis Using Energy Loss Electrons. *Scanning Electron Microscopy/1975, Proc. 8th Annual Scanning E.M. Symposium, IIT Research Institute*, pp. 157-216, 1975.
11. Isaacson, M. and Johnson, D.: The Microanalysis of Light Elements Using Transmitted Energy Loss Electrons. *Ultramicroscopy* 1:33-52, 1975.
12. Cantino, M. and Johnson, D.: Indirect Humidity Measurements in a Side Entry Environmental Cell. *Ultramicroscopy* 2:409-412, 1977.
13. Hutchinson, T.E., Johnson, D.E. and MacKenzie, A.P.: Instrumentation for Direct Observation of Frozen Hydrated Specimens in the Electron Microscope. *Ultramicroscopy* 3:315-324, 1978.
14. Johnson, D.E.: Basic Aspects of Energy Loss Spectrometer Systems. *Ultramicroscopy* 3:361-365, 1978.
15. Johnson, D.E.: Energy Loss Spectrometry in Biological Research. Chapter in: *Analytical Electron Microscopy*, Ed. by Hren, Joy and Goldstein, North Holland, 1979.
16. Johnson, D.E.: The Use of Electron Energy Loss Spectrometry in Biological Electron Microscopy. *Proc. VIII Internat. Cong. on X-ray Optics and Microanalysis*, Ed. by Beaman, Wittry and Ogilvie, Science Press, 1979.
17. Johnson, D.E.: Electron Energy Loss Microanalysis of Biological Material. *Microbeam Analysis in Biology*, Ed. by LeChene and Warner, Academic Press, 1979.
18. Johnson, D.E.: Pre-Spectrometer Optics in a CTEM/SEM. *Ultramicroscopy* 5:163-174, 1980.
19. Johnson, D.E.: Electron Energy Loss Microanalysis System with High Collection Efficiency. *Rev. Sci. Instruments* 51:705-709, 1980.
20. Johnson, D.E.: Post-specimen Optics for Energy Loss Spectrometry, *SEM* 1:33-40, 1980.
21. Johnson, D.E., Csillag, S., and Stern, E.A.: Instrumental Aspects of EXELFS Analysis in the Electron Microscope. Ch. in: *Laboratory EXAFS Facilities - 1980, AIP Conference Proceedings*, NY, 1980.
22. Csillag, S., Johnson, D., and Stern, E.A.: Extended Energy Loss Fine Structure Studies in an Electron Microscope. Chapter in: *Synchrotron Radiation and EXAFS in Materials Research Science*, Ed. by Teo and Joy, Plenum, 1981.
23. Laird, C., Wilkinson, L., Johnson, D., and Sandstrom, C.: Proposed Structural Principles of Polytene Chromosomes. Ch. In: *"Chromosomes Today"*, Vol VII, Ed. by Bennett, Bobrow and Hewett. George, Allen, and Unwin, Hemel Hempstead, England, 1980.
24. Johnson, D.E., Csillag, S., and Stern, E.A.: Analytical Electron Microscopy Using Extended Energy Loss Fine Structure (EXELFS). *Scanning Electron Microscopy I*, pp. 105-115, 1981. (Review - Invited and Refereed).
25. Johnson, D.E.: Limitations to the Sensitivity of Electron Energy Loss Spectrometry. Ch. In: *Microprobe Analysis of Biological Systems*, Ed. by T.E. Hutchinson and A.P. Somlyo, Academic Press, San Francisco 1981.
26. Johnson, D.E., Monson, K.L., Csillag, S. and Stern, E.A.: An Approach to Parallel-Detection Electron Energy Loss Spectrometry. Chapter in: *Analytical Electron Microscopy*, Ed. by R.H. Geiss, pp. 205-209, San Francisco Press, 1981.

27. Hutchinson, T.E., Hecker, J.G. and Johnson, D.E.: Monitoring of Radiation-Induced Change of Biological Specimens, pp. 241-242, San Francisco Press, 1981.
28. Csillag, S., Johnson, D.E. and Stern, E.A.: EXELFS Analysis--The Useful Data Range. Chapter in: Analytical Electron Microscopy, Ed. by R.H. Geiss, pp. 221-224, San Francisco Press, 1981.
29. Monson, K.L., Johnson, D.E. and Csillag, S.: Detection Systems for Energy Loss Spectrometry: Features and Performance. Scanning Electron Microscopy IV, pp. 1411-1419, 1982. (Review-Refereed).
30. Sembrowich, W., Johnson, D.E., Wang, E. and Hutchinson, T.E.: Electron Microprobe Analysis of Fatigued Fast and Slow Twitch Muscle. Proc. 5th Int. Symposium on the Biochemistry of Exercise, Boston, 1982.
31. Izutsu, K.T., Johnson, D.E., Wang, E.S., Tamarin, A., Ensign, W.Y. and Goddard, M.K.: Microbeam Analysis of Resting Rat Parotid Gland. Microbeam Analysis pp. 257-258, 1983.
32. Crooker, A.R., Johnson, D.E., and Mottet, N.K.: Quantifications of Mercury Losses During Biological Specimen Preparation and X-ray Microanalysis. Microbeam Analysis pp. 261-264, 1983.
33. Cantino, M.E., Schackman, R.W., Johnson, D.E. and Hutchinson, T.E.: Changes in Subcellular Elemental Distributions Accompanying the Acrosome Reaction in Sea Urchin Sperm. J. Exp. Zoology 226:255-268, 1983.
34. Izutsu, K.T., Johnson, D.E., and Wang, E.: Elemental Analysis of Labial Glands in Cystic Fibrosis. Microbeam Analysis, pp. 277-280, 1984.
35. Johnson, D.E.: Electron Energy Loss Spectrometry. Chapter in: Analysis of Organic and Biological Surfaces, Ed. by P. Echlin. Wiley-Interscience, pp. 559-580, New York, 1984.
36. Izutsu, K., Johnson, D.E., Wang, E. and Ramsey, B.: Electron Microscope Analysis of Human Labial Gland Secretory Granules in Cystic Fibrosis. J. Clin. Inves. 75:1951-1956, 1985.
37. Johnson, D.E. and Cantino, M.: High Resolution Biological X-ray Microanalysis of Diffusible Ions. Chapter in: Advanced Techniques in Biological Research, Vol. III, Ed. by J.K. Koehler, Springer-Verlag, 1986.
38. Izutsu, K. and Johnson, D.E.: Changes in Elemental Concentrations of Rat Parotid Acinar Cells Following Pilocarpine Stimulation. J. Physiology (London) 381:297-309, 1986.
39. Johnson, D.E.: Analytical Electron Microscopy in the Study of Biological Systems. Annals N.Y. Academy of Sciences 483:241-245, 1986
40. Cantino, M., Wilkinson, L., Goddard, M., and Johnson, D.E.: Beam Induced Mass Loss in High Resolution Biological Microanalysis. J. of Microscopy 144:317, 1986.
41. Izutsu, K.T., Johnson, D.E., Martinez, J.R., Wang, E., Cassity, N., Wang, J. and Tamarin, A.: Intracellular Elemental Concentrations in Resting and Secreting Rat Parotid and Submandibular Glands. J. Dental Res.66:537-540,1987.
42. Izutsu, K.T., Schubert, M., Truelove, E. and Johnson, D.E.: Use of Human Minor Salivary Glands in Basic and Applied Secretion Research. J. Dent. Res. 66:654-659,1987.
43. Johnson, D.E. and Connick, M.: Quantitative Assessment of a Parallel Detection System for Energy Loss Spectrometry. Rev. Sci. Inst. 58:1822-1829, 1987.
44. Wong, J.G., Cantino, M.E., Wilkinson, L.E., Izutsu, K.T. and Johnson, D.E.: Quantitative Elemental Analysis of Digital X-Ray Images. Chapter in: Analytical Electron Microscopy, Ed. by D.C. Joy, pp. 191-194, San Francisco Press, 1987.
45. Verdugo, P., Deyrup-Olsen, I., Aitken, M., Villalon, M. and Johnson, D.E.: Molecular Mechanism of Mucin Secretion: I. The Role of Intragranular Charge Shielding. J. Dental Research. 66:506-509, 1987.
46. Johnson, D.E. and Cantino, M.: Artifacts of Analysis in Biological Electron Microscopy. Chapter in: Artifacts in Biological Electron Microscopy, Ed. by R. Crang and K. Klomparens. Plenum Press 11 (1988) 219.

47. Johnson, D.E., Izutsu, K.T., Cantino, M.E., and Wang, J.: High Spatial Resolution Spectroscopy in the Elemental Microanalysis of Biological Systems. *Ultramicroscopy* 24:221-235, 1988.
48. Goddard, M.K., Izutsu, K.T., Johnson, D.E., Ensign, W.Y., Jr., Izutsu, S.M., Wilkinson, L.E., Chen, S.W. and Wong, J.L.: Evidence for an Anion Exchange System in Rat Parotid Secretory Granules. *Biochemical and Biophysical Research Communications* 155:984-989, 1988.
49. Cantino, M.E. and Johnson D.E.: Elemental Imaging Techniques in Studies of Striated Muscle. *Microbeam Analysis* 1988, San Francisco Press, San Francisco, pp 427-428., 1988.
50. Wong, J.G., Wilkinson, L.E., Chen, S.W., Izutsu, K.T., Johnson, D.E. and Cantino, M.E.: Quantitative Elemental Imaging. *Scanning* 11:12-19, 1989.
51. Cantino, M.E., Izutsu, K.I., Johnson, D.E., Wilkinson, L.E., Kayton, R.J., and Chen, S.W.: Heterogeneity in Elemental Images of Cells and Tissues. *Microbeam Analysis* 1989, San Francisco Press, San Francisco. pp 73-74, 1989.
52. Wong, J.G., Johnson, D.E. and Cantino, M.E.: Semi-Automated Selection of Objects From Digital STEM Images. *Microbeam Analysis* 1989, San Francisco Press, San Francisco pp 94-96, 1989.
53. Izutsu, K.T., Goddard, M.K., Iversen, J. M., Robinovitch, M. R., Oswald, T.K., Cantino, M. C., and Johnson, D. E.: Maturation Related Changes in Mass and Elemental Contents of Secretory Granules as Measured By Electron Microprobe. *Cell and Tissue Research* 263:535-540, 1991.
54. Wong Janet G., Izutsu, Kenneth T., Robinovitch, Murray R., Iversen, Jeanne M., Cantino, Marie E. and Johnson, Dale E.: Microprobe Analysis of Maturation Related Elemental Changes in Rat Parotid Secretory Granules. *Amer J. of Physio.* 261 (Cell Physiology 30): C1033-C1041, 1991.
55. Izutsu, K., Wilkinson, L., Oda, D., Kayton, R., Chen, W.S., Cantino, M. and Johnson, D.: Comparison of elemental concentrations in the acinar cells of the human labial gland. *Arch. Oral Biol.* 36:727-735, 1991.
56. Izutsu, K., Ensign, W., Allen, B., Wilkinson, L., Cantino, M., and Johnson D.: Carbachol-Induced Changes in Rat Parotid Acinar Cell Elemental contents as Measured by Analytical Electron Microscopy. *MicroBeam Analysis.* 2:231-237, 1993.
57. Izutsu, K., Cantino, M., and Johnson, D.: A Review of Electron Probe X-Ray Microanalysis Studies of Salivary Gland Cells. *Microscopy Research and Technique.* 27:71-79, 1994.

RESEARCH ABSTRACTS:

1. Crewe, A.V., Isaacson, M. and Johnson, D.: A Simple Scanning Microscope of Medium Performance. 4th European Regional Conference on Electron Microscopy 1:183-184, 1968.
2. Crewe, A.V., Johnson, D. and Isaacson, M.: An Electron Gun Scanning Microscope. *Proc. EMSA* 26:360-361, 1968.
3. Crewe, A.V., Isaacson, M. and Johnson, D.: A High Performance Energy Analyzer for Use in Electron Scanning Microscopy. *Proc. EMSA* 27:14-15, 1969.
4. Crewe, A.V., Isaacson, M. and Johnson, D.: A Simple, Multipurpose Scanning Microscope. *Proc. 7th Internat. Cong. on Electron Microscopy*, pp. 209-210, Grenoble, France, 1970.
5. Crewe, A.V., Isaacson, M. and Johnson D.: The Energy Loss of 20 kV Electron in Biological Molecules. *Proc. EMSA* 28:262-264, 1970.
6. Crewe, A.V., Isaacson, M. and Johnson, D.: Electron Beam Damage in Biological Specimens. *Proc. EMSA* 28:264-265, 1970.
7. Johnson, D.E. and Isaacson, M.: Low Z Element Analysis Using Energy Loss Electrons in a Scanning Microscope. *Proc. EMSA* 31:290-291, 1973.
8. Johnson, D.E. and Pfeifer, J.: Image Reconstruction Applied to High Voltage Microscopy. *Proc. EMSA* 32:396-397, 1974.
9. Johnson, D.E.: An Image Reconstruction System Applied to High Voltage Microscopy. *Proc. EMSA* 33:292-293, 1975. (Invited Speaker).

10. Johnson, D.E. and Isaacson, M.: Elemental Analysis of Thin Films Using Inner Shell Electron Energy Losses. Proc. EMSA 34:414-415, 1976. (Invited Speaker).
11. Johnson, D.E.: The Uses of Electron Energy Loss Spectrometry in Biology. Proc. EMSA 35:236-237, 1977. (Invited Speaker).
12. Johnson, D.E.: Pre-Spectrometer Optics in a CTEM/STEM. Proc. EMSA 37:528-529, 1979.
13. Johnson, D.E., Csillag, S. and Stern, E.A.: EXAFS Studies on Graphite in a CTEM/STEM. Proc. EMSA 37:526-527, 1979.
14. Sembrowich, W.L., Wang, E., Hutchinson, T.E., and Johnson, D.E.: Electron Microprobe Analysis of Myofilaments, Mitochondria and Sarcoplasmic Reticulum of Soleus Muscle from Exhausted Rats. Proc. Am. Coll. of Sports Medicine Ann. Mtg, 1979.
15. Johnson, D.E. and Csillag, S.: Some Aspects of EXELFS Analysis in the Electron Microscope. Proc. EMSA 38:118-119, 1980.
16. Chen, W.J., Johnson, D.E., Reay, D.T. and Mottet, K.M.: Electron Probe Microanalysis of Dust Particles in the Lungs of Victims of the Eruption of Mt. St. Helens, Lab. Invest 44: QA, 1981.
17. Johnson, D.E., Csillag, S., Monson, K.L. and Stern, E.A.: A Photodiode Detection System for Energy Loss Spectrometry. Proc. EMSA 39th Ann. Mtg, 39, 1981.
18. Hutchinson, T.E., Johnson, D.E., Lee, H.C. and Wang, E.Y.: Advances in Microprobe Analysis Applied to Muscle, Nerve and Gland. Proc. EMSA 40:484-47, 1982. (Invited Speaker).
19. Crooker, A.R., Johnson, D.E. and Mottet, N.K.: Mercury in Primate Paneth Cells Following Methylmercury Hydroxide Ingestion. Proc EMSA 42:290-291, 1984.
20. Johnson, D.E. and Connick, M.: Quantitative Assessment of Parallel Detection Systems for Energy Loss Spectrometry. Proc. Royal Microscopical Society, MICRO 84, London, 1984. (Invited Speaker).
21. Johnson, D.E. and Izutsu, K.T.: Analytical Electron Microscopy in Secretory Cell Studies. Proc. EMSA 43:14-17, 1985.
22. Cantino, M.E., Goddard, M.K., Wilkinson, L.E. and Johnson, D.E.: Electron Beam-Induced Mass Loss in Freeze-Dried Tissue and Protein Samples. Proc. EMSA 43:470-471, 1985.
23. Johnson, D.E. and Cantino, M.: Analytical Electron Microscopy in the Study of Biological Systems. Proc. BCEIA, Beijing, PRC, 1985. (Plenary Lecture).
24. Crooker, A.R., Devlin, E.W., Johnson, D.E. and Mottet, N.K.: Comparative Ultrastructural Pathology of Methyl Mercury Induced Lesions in a Teleostan and a Mammalian Cell Line. Proc. EMSA 44:363- , 1986.
25. Cantino, M.E., Wilkinson, L.E., Wang, E. and Johnson, D.E.: X-ray Microanalysis of Rat Papillary Muscle. Proc. MAS, p. 226, 1986.
26. Izutsu, K. and Johnson, D.E.: Analytical Electron Microscopy of Secretion Related Elemental Distributions. Proc. MAS, p. 225, 1986.
27. Johnson, D.E.: EDS and ELS in the AEM--A Biological Perspective. (Invited Speaker). Proc. EMSA 44:754-755, 1986.
28. Cantino, M.E., Taylor, A., and Johnson, D.E.: Calcium Distributions Within Sarcomeres of Skinned Skeletal Muscle Fibers. Biophysical Society Abstracts, 1987.
29. Cantino, M.E. and Johnson, D.E.: Elemental Imaging Techniques in Studies of Striated Muscles. Proc. MAS, p 427, 1988
30. Villalon, M., Bausbaum, C.B., Johnson, D.E., and Verdugo, P.: X-Ray Microanalysis of Secretory Granules from Respiratory Goblet Cells. FASEB 2:Abstract # 958A, 1988.
31. Cantino, M.E., Allen, T.S., Johnson, D.E. and Gordon, A.M.: Quantitative Imaging in High Resolution Studies of Calcium Binding to Myofilaments, Proc XII International Congress for Electron Microscopy, Seattle, 1990.

32. Villalon, M.J., Johnson, D.E., Verdugo, P.J.: X-ray Microanalysis of Calcium Content in Secretory Granules of Goblet Cells of the Rabbit Oviduct, Proc XII International Congress for Electron Microscopy, Seattle, 1990.
33. Hurley, B.J., Cantino, M.E. and Johnson, D.E.: Effects of Ryanodine and Caffeine on Subcellular Elemental Distributions in Relaxed and Tetanized Rat Papillary Muscles, Proc EMSA, p 662, 1992.
34. Johnson, D.E.: Image Validity in the use of Electron Energy Loss as an Elemental Imaging Tool in Biology, Proc. IUMAS, Sydney, Australia. 1996 (Invited Speaker).

SELECTED GRADUATE EDUCATION CONTRIBUTIONS:

Western Association of Graduate Schools Annual Meeting, Tempe, Arizona, 1990.

"A Draft Policy Statement on Academic Review of Academic Programs"

Western Association of Graduate Schools Annual Meeting, Vancouver, B.C. 1996.

"Preparing Future Faculty: Innovations and Creative Linkages between Graduate and Undergraduate Education",

Conference of Southern Graduate Schools Annual Meeting, Richmond VA, February 2001

"The Changing Role of the Graduate Dean"

Council of Graduate Schools New Deans Institute and Summer Workshop, July 2003

"GRE Testing" (with David Payne)

Council of Graduate Schools Annual Meeting, San Francisco, CA, December 2003

"Use of the GRE in Master's and Ph.D. Programs – Views from the Field" (With Kurt Geisinger and David Payne)

Conference of Southern Graduate Schools Annual Meeting, Charlotte, NC, February 2004

"The GRE and Access to Graduate Education (with David Payne).

Council of Graduate Schools Communicator, June 2004 "Appropriate Use of GRE Scores in Graduate Admissions Decisions" (with David Payne).