

CURRICULUM VITAE

Bob B. Buchanan

Professor Emeritus, Department of Plant & Microbial Biology
University of California, Berkeley

EDUCATION

Emory & Henry College, B.A. *cum laude*; Distinguished Science Graduate Virginia Private Colleges, 1958
University of Texas, Austin, Summer, 1958
Duke University, Ph.D. (Microbiology), 1962
University of California, Berkeley, Postdoctoral Scholar (Biochemistry), 1962-63

PROFESSIONAL EXPERIENCE

UC Berkeley

Assistant Microbiologist, California Agricultural Experiment Station & Lecturer; 1963-68
Associate Professor, 1968-74; Professor, 1974-81, Acting Chairman, 1978-80: Department of Cell Physiology
Professor, 1982-1990; Chairman, 1982-88: Division of Molecular Plant Biology
Professor, 1990-2013; Chair, 1998-99: Department of Microbial & Plant Biology
Chair, 1996-99, Division of Microbial Biology; Executive Associate Dean: College of Natural Resources, 2008-13
Professor Emeritus, 2013-

Sabbatical Leave: Universität München, 1974-75, 2007-08; University of Oslo, 1975; Professor Invité, Université de Paris-Sud, 1984, 1991; Université Henri Poincaré Nancy 1, 2002; Max Planck Institut, Golm, 2008

HONORS AND FELLOWSHIPS

Member: National Academy of Sciences, Elected 1995; Japanese Society of Plant Physiologists, Honorary, Elected 2009
Fellow: American Academy of Arts & Sciences, Elected 1997; American Association for the Advancement of Science, 1997; American Academy of Microbiology, 2006; American Society of Plant Biologists, Elected 2007
Awards: Special Creativity Award, 1982 and Senior Scientist Award, 1984, National Science Foundation; Bessenyei Medal, György Bessenyei College & Hungarian Ministry of Education, 1987; Charles F. Kettering Award for Excellence in Photosynthesis, American Society of Plant Biologists, 1998; Distinguished Achievement Award, Emory & Henry College, 2000; Book Awards (Society of National Association Publications; Association Trends) 2001; Who's Who in America, 2004; William & Martha DeFriece Award, Emory & Henry College, 2005; Stephen Hales Prize, American Society of Plant Biologists, 2005; College of Natural Resources Career Achievement Award, UC Berkeley, 2007; Humboldt Research Award, Alexander von Humboldt Foundation, 2007; Lifetime Achievement Award, Rebeiz Foundation, 2012; Berkeley Citation, 2013
Fellowships: Duke University, 1958-59; NIH Predoctoral, 1960; NIH Postdoctoral, 1962; Guggenheim Foundation, 1974; Organisation de Coopération et Développement Économiques, 1986
Endowed Lecture: Bob B. Buchanan Annual Lecture, Department of Plant & Microbial Biology, UC Berkeley, est. 2000
Honorary Professorships: Henan Agricultural University, Zhengzhou, 2007; Nanning University, 2009

UNIVERSITY SERVICE AT BERKELEY

Academic Senate: Committee on Budget & Interdepartmental Relations, 1988-90, (Chair, 1991-92); UC Systemwide Academic Personnel Committee, 1991-92; Faculty Awards Committee Chair, 2003-2007; Student Prizes, 2008-11
Building Committees: Natural Resources Laboratory Chair, 1976-81, LSA, Koshland Hall, 1982-89;
Chancellor's Committees: Biology Reorganization, 1980-81; Academic Planning Board, 1991-92; Research Administration Advisory Board, 1994-99; Advisory Council on Biology, 1995-96

PROFESSIONAL SERVICE

President: American Society of Plant Biologists, 1995-96.
Executive Board: Council of Society of Scientific Presidents, 1997-98.
International Conferences Organized: Thioredoxins, 1981; Fructose-2,6-bisphosphate in Plants, 1987; U.S.-Japan Seminar, Environmental Plant Stresses, 1988; Jacques Monod, Thioredoxin & Glutaredoxin, 1990
International Committees: Origin of Life Congress, 1986; Botanical Congress, 1987
Editorial Boards: Plant Physiology, 1982-95; Archives of Biochemistry & Biophysics, 1984-2001
Advisory Committees (Selected): National Science Foundation: Metabolic Biology, 1980-84; Department of Energy: Oak Ridge National Laboratory, 1979; Energy Biosciences (Chair), 1993. National Aeronautical & Space Administration: Exobiology, 1981; 1985-90. Carnegie Institution (Stanford), 1988-92. U.S. Department of Agriculture: Competitive Research Grants, Photosynthesis, 1980; Program Manager, 1985-86. Food & Drug Administration: Food Biotechnology, 2002-05; Deutsche Forschungs Gemeinschaft, 2013

BIBLIOGRAPHY

Textbook

Buchanan, B.B, Gruissem, W. and Jones, R.L. (2015) *Biochemistry & Molecular Biology of Plants*, Second Edition. Wiley Blackwell, Chichester, UK.

First Edition published 2000. American Society of Plant Biologists, Rockville, MD.

Research Articles

1. Buchanan, B.B. and Pine, L. (1962) Characterization of a propionic acid producing actinomycete, *Actinomyces propionicus*, sp. nov. *J. Gen. Microbiol.* **28**, 305-323.
2. Buchanan, B.B. and Pine, L. (1963) Factors influencing the fermentation and growth of an atypical strain of *Actinomyces naeslundii*. *Sabouraudia* **3**, 26-39.
3. Buchanan, B.B., Lovenberg, W. and Rabinowitz, J.C. (1963) A comparison of clostridial ferredoxins. *Proc. Natl. Acad. Sci. USA* **49**, 345-353.
4. Lovenberg, W., Buchanan, B.B. and Rabinowitz, J.C. (1963) Studies on the chemical nature of clostridial ferredoxin. *J. Biol. Chem.* **238**, 3899-3913.
5. Buchanan, B.B. and Rabinowitz, J.C. (1964) Some properties of *Methanobacterium omelianskii* ferredoxin. *J. Bacteriol.* **88**, 806-807.
6. Bachofen, R., Buchanan, B.B. and Arnon, D.I. (1964) Ferredoxin as a reductant in pyruvate synthesis by a bacterial extract. *Proc. Natl. Acad. Sci. USA* **51**, 690-694.
7. Buchanan, B.B., Bachofen, R. and Arnon, D.I. (1964) Role of ferredoxin in the reductive assimilation of CO₂ and acetate by extracts of the photosynthetic bacterium, *Chromatium*. *Proc. Natl. Acad. Sci. USA* **52**, 839-847.
8. Buchanan, B.B. and Pine, L. (1965) Relationship of carbon dioxide to aspartic acid and glutamic acid in *Actinomyces naeslundii*. *J. Bacteriol.* **89**, 729-733.
9. Buchanan, B.B. and Arnon, D.I. (1966) Ferredoxin-dependent synthesis of labelled pyruvate from labelled acetyl coenzyme A and carbon dioxide. *Biochem. Biophys. Res. Commun.* **20**, 163-168.
10. Evans, M.C.W. and Buchanan, B.B. (1965) Photoreduction of ferredoxin and its use in carbon dioxide fixation by a subcellular system from a photosynthetic bacterium. *Proc. Natl. Acad. Sci. USA* **53**, 1420-1425.
11. Buchanan, B.B. and Evans, M.C.W. (1965) The synthesis of a-ketoglutarate from succinate and carbon dioxide by a subcellular preparation of a photosynthetic bacterium. *Proc. Natl. Acad. Sci. USA* **54**, 1212-1218.

12. Evans, M.C.W., Buchanan, B.B. and Arnon, D.I. (1966) A new ferredoxin-dependent carbon reduction cycle in a photosynthetic bacterium. *Proc. Natl. Acad. Sci. USA* **55**, 928-934.
13. Buchanan, B.B. and Evans, M.C.W. (1966) The synthesis of phosphoenolpyruvate from pyruvate and ATP by extracts of photosynthetic bacteria. *Biochem. Biophys. Res. Commun.* **22**, 484-487.
14. Buchanan, B.B. and Pine, L. (1967) Path of glucose breakdown and cell yields of a facultative anaerobe, *Actinomyces naeslundii*. *J. Gen. Microbiol.* **46**, 225.
15. Buchanan, B.B., Kalberer, P.P. and Arnon, D.I. (1967) Ferredoxin-activated fructose diphosphatase in isolated chloroplasts. *Biochem. Biophys. Res. Commun.* **29**, 74-79.
16. Buchanan, B.B., Evans, M.C.W. and Arnon, D.I. (1967) Ferredoxin-dependent carbon assimilation in *Rhodospirillum rubrum*. *Arch. Microbiol.* **59**, 32-40.
17. Kalberer, P.P., Buchanan, B.B. and Arnon, D.I. (1967) Rates of photosynthesis by isolated chloroplasts. *Proc. Natl. Acad. Sci. USA* **57**, 1542-1549.
18. Buchanan, B.B. and Bachofen, R. (1968) Ferredoxin-dependent reduction of nicotinamide-adenine dinucleotides with hydrogen gas by subcellular preparations from the photosynthetic bacterium, *Chromatium*. *Biochim. Biophys. Acta* **162**, 607-610.
19. Buchanan, B.B. and Evans, M.C.W. (1969) Photoreduction of ferredoxin and its use in NAD(P)⁺ reduction by a subcellular preparation from the photosynthetic bacterium, *Chlorobium thiosulfatophilum*. *Biochim. Biophys. Acta* **180**, 123-129.
20. Buchanan, B.B. (1969) Role of ferredoxin in the synthesis of α -ketobutyrate from propionyl coenzyme A and carbon dioxide by enzymes from photosynthetic and nonphotosynthetic bacteria. *J. Biol. Chem.* **244**, 4218-4233.
21. Buchanan, B.B., Matsubara, H. and Evans, M.C.W. (1969) Ferredoxin from the photosynthetic bacterium, *Chlorobium thiosulfatophilum*. A link to ferredoxins from nonphotosynthetic bacteria. *Biochim. Biophys. Acta* **189**, 46-53.
22. Rao, K.K., Matsubara, H., Buchanan, B.B. and Evans, M.C.W. (1969) Amino acid composition and terminal sequences of ferredoxins from two photosynthetic green bacteria. *J. Bacteriol.* **100**, 1411-1412.
23. Schürmann, P., Buchanan, B.B. and Matsubara, H. (1970) Ferredoxin from fern and amaranthus: Two diverse plants with similar ferredoxins. *Biochim. Biophys. Acta* **223**, 450-452.
24. Buchanan, B.B., Schürmann, P. and Kalberer, P.P. (1971) Ferredoxin-activated fructose diphosphatase of spinach chloroplasts: Resolution of the system, properties of the alkaline fructose diphosphatase component, and physiological significance of the ferredoxin-linked activation. *J. Biol. Chem.* **246**, 5952-5959.

25. Shanmugam, K.T., Buchanan, B.B. and Arnon, D.I. (1972) Ferredoxins in light-and dark-grown photosynthetic cells with special reference to *Rhodospirillum rubrum*. *Biochim. Biophys. Acta* **256**, 477-486.
26. Schürmann, P., Buchanan, B.B. and Arnon, D.I. (1972) Role of cyclic photophosphorylation in photosynthetic carbon dioxide assimilation by isolated chloroplasts. *Biochim. Biophys. Acta* **267**, 111-124.
27. Buchanan, B.B. and Schürmann, P. (1972) A regulatory mechanism for CO₂ assimilation in plant photosynthesis: Activation of ribulose 1,5-diphosphate carboxylase by fructose 6-phosphate and deactivation by fructose 1,6-diphosphate. *FEBS Lett.* **23**, 157-159.
28. Buchanan, B.B., Schürmann, P. and Shanmugam, K.T. (1972) Role of the reductive carboxylic acid cycle in a photosynthetic bacterium lacking ribulose 1,5-diphosphate carboxylase. *Biochim. Biophys. Acta* **283**, 136-145.
29. Buchanan, B.B. and Schürmann, P. (1973) Regulation of ribulose 1,5-diphosphate carboxylase in the photosynthetic assimilation of carbon dioxide. *J. Biol. Chem.* **248**, 4956-4964.
30. Magyarosy, A.C., Buchanan, B.B. and Schürmann, P. (1973) Effect of a systemic virus infection on chloroplast function and structure. *Virology* **55**, 426-438.
31. Knaff, D.B., Buchanan, B.B. and Malkin, R. (1973) Effect of oxidation-reduction potential on light-induced cytochrome and bacteriochlorophyll reactions in chromatophores from the photosynthetic green bacterium *Chlorobium*. *Biochim. Biophys. Acta* **325**, 94-101.
32. Montalbini, P. and Buchanan, B.B. (1974) Effect of a rust infection on photophosphorylation by isolated chloroplasts. *Physiol. Plant Pathol.* **4**, 191-196.
33. Buchanan, B.B. (1974) Orthophosphate requirement for the formation of phosphoenolpyruvate from pyruvate by enzyme preparations from photosynthetic bacteria. *J. Bacteriol.* **119**, 1066-1068.
34. Schürmann, P. and Buchanan, B.B. (1975) Role of ferredoxin in the activation of sedoheptulose diphosphatase in isolated chloroplasts. *Biochim. Biophys. Acta* **376**, 189-192.
35. Knaff, D.B. and Buchanan, B.B. (1975) Cytochrome b and photosynthetic sulfur bacteria. *Biochim. Biophys. Acta* **376**, 549-560.
36. Magyarosy, A.C., Buchanan, B.B. and Duffus, J.E. (1975) Protection of sugar beet plants against development of rust disease by infection with curly top agent. *Phytopathology* **65**, 361-362.
37. Magyarosy, A.C. and Buchanan, B.B. (1975) Effect of bacterial infiltration on photosynthesis of bean leaves. *Phytopathology* **65**, 777-780.

38. Buchanan, B.B., Schürmann, P. and Wolosiuk, R.A. (1976) Appearance of sedoheptulose 1,7-diphosphatase activity on conversion of chloroplast fructose 1,6-diphosphatase from dimer form to monomer form. *Biochem. Biophys. Res. Commun.* **69**, 970-978.
39. Magyarosy, A.C., Schürmann, P. and Buchanan, B.B. (1976) Effect of powdery mildew infection on photosynthesis by leaves and chloroplasts of sugar beets. *Plant Physiol.* **57**, 486-489.
40. Buchanan, B.B. and Sirevåg, R. (1976) Ribulose 1,5-diphosphate carboxylase and *Chlorobium thiosulfatophilum*. *Arch. Microbiol.* **109**, 15-19.
41. Wolosiuk, R.A. and Buchanan, B.B. (1976) Studies on the regulation of chloroplast NADP-linked glyceraldehyde 3-phosphate dehydrogenase. *J. Biol. Chem.* **251**, 6456-6461.
42. Schürmann, P., Wolosiuk, R.A., Breazeale, V.D. and Buchanan, B.B. (1976) Two proteins function in the regulation of photosynthetic CO₂ assimilation in chloroplasts. *Nature* **263**, 257-258.
43. Buchanan, B.B., Eiermann, W., Riccio, P., Aquila, H. and Klingenberg, M. (1976) Antibody evidence for different conformational states of ADP, ATP translocator protein isolated from mitochondria. *Proc. Natl. Acad. Sci. USA* **73**, 2280-2284.
44. Buchanan, B.B. and Wolosiuk, R.A. (1976) Photosynthetic regulatory protein found in animal and bacterial cells. *Nature* **264**, 669-670.
45. Sirevåg, R., Buchanan, B.B., Berry, J.A. and Troughton, J.M. (1977) Mechanisms of CO₂ fixation in bacterial photosynthesis studied by the carbon isotope fractionation technique. *Arch. Microbiol.* **112**, 35-38.
46. Wolosiuk, R.A. and Buchanan, B.B. (1977) Thioredoxin and glutathione regulate photosynthesis in chloroplasts. *Nature* **266**, 565-567.
47. Wolosiuk, R.A., Buchanan, B.B. and Crawford, N.A. (1977) Regulation of NADP-malate dehydrogenase by the light-actuated ferredoxin/thioredoxin system of chloroplasts. *FEBS Lett.* **81**, 253-258.
48. Holmgren, A., Buchanan, B.B. and Wolosiuk, R.A. (1977) Photosynthetic regulatory protein from rabbit liver is identical with thioredoxin. *FEBS Lett.* **82**, 351-354.
49. McKinney, D.W., Buchanan, B.B. and Wolosiuk, R.A. (1978) Activation of chloroplast ATPase by reduced thioredoxin. *Phytochem.* **17**, 794-795.
50. Wolosiuk, R.A. and Buchanan, B.B. (1978) Activation of chloroplast NADP-linked glyceraldehydes 3-phosphate dehydrogenase by the ferredoxin/thioredoxin system. *Plant Physiol.* **61**, 669-671.
51. Wolosiuk, R.A. and Buchanan, B.B. (1978) Regulation of chloroplast phosphoribulokinase by the ferredoxin/thioredoxin system. *Arch. Biochem. Biophys.* **189**, 97-101.

52. Buchanan, B.B., Crawford, N.A. and Wolosiuk, R.A. (1978) Ferredoxin/thioredoxin system functions with effectors in activation of NADP-glyceraldehyde 3-phosphate dehydrogenase of barley seedlings. *Plant Sci. Lett.* **12**, 257-264.
53. Breazeale, V.D., Buchanan, B.B. and Wolosiuk, R.A. (1978) Chloroplast sedoheptulose 1,7-bisphosphatase: Evidence for regulation by the ferredoxin/thioredoxin system. *Z. Naturforsch.* **33c**, 521-528.
54. McKinney, D.W., Buchanan, B.B. and Wolosiuk, R.A. (1979) Association of a thioredoxin-like protein with chloroplast coupling factor (CF₁). *Biochem. Biophys. Res. Commun.* **86**, 1178-1184.
55. Buchanan, B.B., Crawford, N.A. and Wolosiuk, R.A. (1979) Activation of plant acid phosphatases by oxidized glutathione and dehydroascorbate. *Plant Sci. Lett.* **14**, 245-251.
56. Nishizawa, A.N., Wolosiuk, R.A. and Buchanan, B.B. (1979) Chloroplast phenylalanine ammonia-lyase from spinach leaves. *Planta* **145**, 7-12.
57. Wolosiuk, R.A., Crawford, N.A., Yee, B.C. and Buchanan, B.B. (1979) Isolation of three thioredoxins from spinach leaves. *J. Biol. Chem.* **254**, 1627-1632.
58. Crawford, N.A., Yee, B.C., Nishizawa, A.N. and Buchanan, B.B. (1979) Occurrence of *f* and *m*-type cytoplasmic thioredoxins in leaves. *FEBS Lett.* **104**, 141-145.
59. de la Torre, A., Lara, C., Wolosiuk, R.A. and Buchanan, B.B. (1979) Ferredoxin-thioredoxin reductase: A chromophore-free protein of chloroplasts. *FEBS Lett.* **107**, 141-145.
60. Lara, C., de la Torre, A. and Buchanan, B.B. (1980) A new protein factor functional in the ferredoxin-dependent light activation of chloroplast fructose 1,6-bisphosphatase. *Biochem. Biophys. Res. Commun.* **93**, 544-551.
61. Lara, C., de la Torre, A. and Buchanan, B.B. (1980) Ferralterin: An iron-sulfur protein functional in enzyme regulation in photosynthesis. *Biochem. Biophys. Res. Commun.* **94**, 1337-1344.
62. Marcus, F., Edelstein, I., Nishizawa, A.N. and Buchanan, B.B. (1980) Limited proteolysis of chloroplast fructose 1,6-bisphosphatase by subtilisin. *Biochem. Biophys. Res. Commun.* **97**, 1304-1310.
63. Hutcheson, S.W. and Buchanan, B.B. (1980) Polyphenol oxidation by *Vicia faba* chloroplast membranes. Studies on the latent membrane-bound polyphenol oxidase and on the mechanism of photochemical polyphenol oxidation. *Plant Physiol.* **66**, 1150-1154.
64. Nishizawa, A.N. and Buchanan, B.B. (1981) Enzyme regulation in C₄ photosynthesis. Purification and properties of thioredoxin-linked fructose bisphosphatase and sedoheptulose bisphosphatase from corn leaves. *J. Biol. Chem.* **256**, 6119-6126.

65. Jacquot, J.-P., Buchanan, B.B., Martin, F. and Vidal, J. (1981) Enzyme regulation in C₄ photosynthesis. Purification and properties of thioredoxin-linked NADP-malate dehydrogenase from corn leaves. *Plant Physiol.* **68**, 300-304.
66. Wada, K. and Buchanan, B.B. (1981) Purothionin: A seed protein with thioredoxin activity. *FEBS Lett.* **124**, 237-240.
67. Montalbini, P., Buchanan, B.B. and Hutcheson, S.W. (1981) Effect of rust infection on rates of photochemical polyphenol oxidation and latent polyphenol oxidase activity of *Vicia faba* chloroplast membranes. *Physiol. Plant Pathol.* **18**, 51-57.
68. Hammel, K.E. and Buchanan, B.B. (1981) Thioredoxin and ferredoxin-thioredoxin reductase activity occur in a fermentative bacterium. *FEBS Lett.* **130**, 88-92.
69. Crawford, N.A., Yee, B.C. and Buchanan, B.B. (1981) Thioredoxin profiles of seeds, etiolated seedlings, and green seedlings of developing barley plants. *Plant Sci Lett.* **22**, 317-326.
70. Yee, B.C., de la Torre, A., Crawford, N.A., Lara, C., Carlson, D.E. and Buchanan, B.B. (1981) The ferredoxin/thioredoxin system of enzyme regulation in a cyanobacterium. *Arch. Microbiol.* **130**, 14-18.
71. Johnson, T.C., Buchanan, B.B. and Malkin, R. (1981) Photosynthetic electron transport by Zwittergent-extracted chloroplasts requires solubilized plastocyanin. *FEBS Lett.* **133**, 296-300.
72. Montalbini, P. and Buchanan, B.B. (1981) Rates of photosynthesis of two lichens and of their isolated algal components. *Giorn. Bot. Ital.* **115**, 77-82.
73. de la Torre, A., Lara, C., Yee, B.C., Malkin, R. and Buchanan, B.B. (1982) Physiochemical properties of ferraltherin, a regulatory iron-sulfur protein functional in oxygenic photosynthesis. *Arch. Biochem. Biophys.* **213**, 545-550.
74. Wolosiuk, R.A., Hertig, C.M., Nishizawa, A.N. and Buchanan, B.B. (1982) Enzyme regulation in C₄ photosynthesis. Role of Ca²⁺ in thioredoxin-linked activation of sedoheptulose bisphosphatase from corn leaves. *FEBS Lett.* **140**, 31-35.
75. Cséke, C., Weeden, N.F., Buchanan, B.B. and Uyeda, K. (1982) A special fructose bisphosphate functions as a cytoplasmic regulatory metabolite in green leaves. *Proc. Natl. Acad. Sci. USA* **79**, 4322-4326.
76. Cséke, C., Nishizawa, A.N. and Buchanan, B.B. (1982) Modulation of chloroplast phosphofructokinase by NADPH. A mechanism for linking light to the regulation of glycolysis. *Plant Physiol.* **70**, 658-661.
77. Weeden, N.F. and Buchanan, B.B. (1983) Leaf cytosolic fructose 1,6-bisphosphatase. A potential target site in low temperature stress. *Plant Physiol.* **72**, 259-261.

78. Cséke, C. and Buchanan, B.B. (1983) An enzyme synthesizing fructose 2,6-bisphosphate occurs in leaves and is regulated by metabolite effectors. *FEBS Lett.* **155**, 139-142.
79. Soll, J. and Buchanan, B.B. (1983) Phosphorylation of chloroplast ribulose bisphosphate carboxylase/oxygenase small subunit by an envelope-bound protein kinase *in situ*. Communication. *J. Biol. Chem.* **258**, 6686-6689.
80. Hammel, K.E., Cornwell, K.L. and Buchanan, B.B. (1983) Ferredoxin/flavoprotein-linked pathway for the reduction of thioredoxin. *Proc. Natl. Acad. Sci. USA* **80**, 3681-3685.
81. Hutcheson, S.W. and Buchanan, B.B. (1983) Enzyme regulation in Crassulacean acid metabolism photosynthesis. Studies on the ferredoxin/thioredoxin system of *Kalanchoe daigremontiana*. *Plant Physiol.* **72**, 870-876. [First of two papers]
82. Hutcheson, S.W. and Buchanan, B.B. (1983) Enzyme regulation in Crassulacean acid metabolism photosynthesis. Studies on thioredoxin-linked enzymes of *Kalanchoe daigremontiana*. *Plant Physiol.* **72**, 877-885. [Second of two papers]
83. Perrot-Rechenmann, C., Jacquot, J.-P., Gadal, P., Weeden, N.F., Cséke, C. and Buchanan, B.B. (1983) Localization of NADP-malate dehydrogenase of corn leaves by immunological methods. *Plant Sci. Lett.* **30**, 219-226.
84. Cséke, C., Stitt, M., Balogh, A. and Buchanan, B.B. (1983) A product-regulated fructose 2,6-bisphosphatase occurs in green leaves. *FEBS Lett.* **162**, 103-106.
85. Jacquot, J.-P., Gadal, P., Nishizawa, A.N., Yee, B.C., Crawford, N.A. and Buchanan, B.B. (1984) Enzyme regulation in C₄ photosynthesis: Mechanism of activation of NADP-malate dehydrogenase by reduced thioredoxin. *Arch. Biochem. Biophys.* **228**, 170-178.
86. Balogh, A., Wong, J.H., Wötzel, C., Soll, J., Cséke, C. and Buchanan, B.B. (1984) Metabolite-mediated catalyst conversion of PFK and PFP: A mechanism of enzyme regulation in green plants. *FEBS Lett.* **169**, 287-292.
87. Johnson, T.C., Crawford, N.A. and Buchanan, B.B. (1984) Thioredoxin system of the photosynthetic anaerobe, *Chromatium vinosum*. *J. Bacteriol.* **158**, 1061-1069.
88. Wong, J.H., Balogh, A. and Buchanan, B.B. (1984) Pyrophosphate functions as phosphoryl donor with UDP-glucose-treated mammalian phosphofructokinase. *Biochem. Biophys. Res. Commun.* **121**, 842-847.
89. Crawford, N.A., Sutton, C.W., Yee, B.C., Johnson, T.C., Carlson, D.C. and Buchanan, B.B. (1984) Contrasting modes of photosynthetic enzyme regulation in oxygenic and anoxygenic prokaryotes. *Arch. Microbiol.* **139**, 124-129.
90. Stitt, M., Cséke, C. and Buchanan, B.B. (1984) Regulation of fructose 2,6-bisphosphate concentration in spinach leaves. *Eur. J. Biochem.* **143**, 89-93.
91. Soll, J., Wötzel, C. and Buchanan, B.B. (1985) Enzyme regulation in C₄ photosynthesis. Identification and localization of activities catalyzing the synthesis and hydrolysis of fructose-2,6-bisphosphate in corn leaves. *Plant Physiol.* **77**, 999-1003.

92. Wolosiuk, R.A., Corley, E., Crawford, N.A. and Buchanan, B.B. (1985) Dual effects of organic solvents on chloroplast phosphoribulokinase and NADP-glyceraldehyde-3-P dehydrogenase. *FEBS Lett.* **189**, 212-216.
93. Stitt, M., Cséke, C. and Buchanan, B.B. (1985) Occurrence of a metabolite-regulated enzyme synthesizing fructose-2,6-bisphosphate in plant sink tissues. *Physiol. Vég.* **23**, 73-79.
94. Klecan, A.L., Elliot, V.J. and Buchanan, B.B. (1986) A recognition metabolite for biological stress in plants: Fructose-2,6-bisphosphate. *Comptes-Rendus* **302**, 51-54.
95. Stitt, M., Cséke, C. and Buchanan, B.B. (1986) Ethylene-induced increase in fructose-2,6-bisphosphate in plant storage tissues. *Plant Physiol.* **80**, 246-248.
96. Crawford, N.A., Yee, B.C., Hutcheson, S.W., Wolosiuk, R.A. and Buchanan, B.B. (1986) Enzyme regulation in C₄ photosynthesis: Purification, properties, and activities of thioredoxin from C₄ and C₃ plants. *Arch. Biochem. Biophys.* **244**, 1-15.
97. Droux, M., Jacquot, J.P., Miginiac-Maslow, M., Gadal, P., Huet, J.C., Crawford, N.A., Yee, B.C. and Buchanan, B.B. (1987) Ferredoxin-thioredoxin reductase: An iron-sulfur enzyme linking light to enzyme regulation in oxygenic photosynthesis. Purification and properties of the enzyme from C₃, C₄ and cyanobacterial species. *Arch. Biochem. Biophys.* **252**, 426-439.
98. Macdonald, F.D., Cséke, C., Chou, Q. and Buchanan, B.B. (1987) Activities synthesizing and degrading fructose 2,6-bisphosphate in spinach leaves reside on different proteins. *Proc. Natl. Acad. Sci. USA* **84**, 2742-2746.
99. Wong J., Yee, B.C. and Buchanan, B.B. (1987) A novel type of phosphofructokinase from plants. *J. Biol. Chem.* **262**, 3185-3191.
100. Johnson, T.C., Cao, R.Q., Kung, J.E. and Buchanan, B.B. (1987) Thioredoxin and NADP-thioredoxin reductase from cultured carrot cells. *Planta* **171**, 321-331.
101. Droux, M., Miginiac-Maslow, M., Jacquot, J.-P., Gadal, P., Crawford, N.A., Kosower, N.S. and Buchanan, B.B. (1987) Ferredoxin-thioredoxin reductase: A catalytically active dithiol group links photoreduced ferredoxin to thioredoxin functional in photosynthetic enzyme regulation. *Arch. Biochem. Biophys.* **256**, 372-380.
102. Mathews, W.R., Johnson, R.S., Cornwell, K.L., Johnson, T.C., Buchanan, B.B. and Biemann, K. (1987) Mass spectrometrically derived amino acid sequence of thioredoxin from *Chlorobium*, an evolutionarily prominent photosynthetic bacterium. *J. Biol. Chem.* **262**, 7537-7545.
103. Droux, M., Crawford, N.A. and Buchanan, B.B. (1987) Mechanism of thioredoxin-linked activation of chloroplast fructose-1,6-bisphosphatase. *Comptes-Rendus* **305**, 335-341.

104. Macdonald, F.D., Chou, Q. and Buchanan, B.B. (1987) Ion-exchange chromatography separates activities synthesizing and degrading fructose 2,6-bisphosphate from C₃ and C₄ leaves but not from rat liver. *Plant Physiol.* **85**, 13-16.
105. Johnson, T.C., Wada, K., Buchanan, B.B. and Holmgren, A. (1987) Reduction of puorothionin by the wheat seed thioredoxin system. *Plant Physiol.* **85**, 446-451.
106. Klecan, A.L. and Buchanan, B.B. (1988) Powdery mildew infection alters fructose-2,6-bisphosphate content and sucrose to starch ratio in leaves of wheat plants actively forming grain. *Physiol. Mol. Plant Path.* **32**, 221-227.
107. Johnson, T.C., Yee, B.C., Carlson, D.E., Buchanan, B.B., Johnson, R.S., Mathews, W.R. and Biemann, K. (1988) Thioredoxin from *Rhodospirillum rubrum*: Primary structure and relation to thioredoxins from other photosynthetic bacteria. *J. Bacteriol.* **170**, 2406-2408.
108. Hirasawa, M., Droux, M., Gray, K.A., Boyer, J.M., Davis, D.J., Buchanan, B.B. and Knaff, D.B. (1988) Ferredoxin-thioredoxin reductase: properties of its complex with ferredoxin. *Biochim. Biophys. Acta* **935**, 1-8.
109. Florencio, F.J., Yee, B.C., Johnson, T.C., and Buchanan, B.B. (1988) An NADP/thioredoxin system in leaves: purification and characterization of NADP-thioredoxin reductase and thioredoxin *h* from spinach. *Arch. Biochem. Biophys.* **266**, 496-507.
110. Wong, J.H., Kang, T. and Buchanan, B.B. (1988) A novel pyrophosphate fructose-6-phosphate 1-phosphotransferase from carrot roots. Relation to PFK from the same source. *FEBS Lett.* **238**, 405-410.
111. Smeekens, S., Macdonald, F.D. and Buchanan, B.B. (1989) Studies on the entry of fructose-2,6-bisphosphate into chloroplasts. *Plant Physiol.* **89**, 1270-1274.
112. Crawford, N.A., Droux, M., Kosower, N.S. and Buchanan, B.B. (1989) Evidence for function of the ferredoxin/thioredoxin system in the reductive activation of target enzymes of isolated intact chloroplasts. *Arch. Biochem. Biophys.* **271**, 223-239.
113. Muller, E.G.D. and Buchanan, B.B. (1989) Thioredoxin is essential for photosynthetic growth. The thioredoxin *m* gene of *Anacystis nidulans*. *J. Biol. Chem.* **264**, 4008-4014.
114. Kiss, F., Johnson, T.C., Klecan, A.L., Vincze, G., Buchanan, B.B. and Balogh, A. (1989) Identification of two forms of PFK and a fructose-2,6-bisphosphate independent form of PFP in a green alga. *Photosyn. Res.* **21**, 123-128.
115. Macdonald, F.D., Chou, Q., Buchanan, B.B. and Stitt, M. (1989) Purification and characterization of fructose-2,6-bisphosphatase, a substrate-specific cytosolic enzyme from leaves. *J. Biol. Chem.* **264**, 5540-5544.
116. Huppe, H.C. and Buchanan, B.B. (1989) Activation of a chloroplast type of fructose bisphosphatase from *Chlamydomonas reinhardtii* by light-mediated agents. *Z. Naturforsch.* **44c**, 487-494.

117. Huppe, H.C., de Lamotte-Guéry, F., Jacquot, J.-P. and Buchanan, B.B. (1990) The ferredoxin-thioredoxin system of a green alga, *Chlamydomonas reinhardtii*. Identification and characterization of thioredoxins and ferredoxin-thioredoxin reductase components. *Planta* **180**, 341-351.
118. Hartman, H., Syvanen, M. and Buchanan, B.B. (1990) Contrasting evolutionary histories of chloroplast thioredoxins *f* and *m*. *Mol. Biol. Evol.* **7**, 247-254.
119. Schmidt, C.L., Danneel, H.-J., Schultz, G. and Buchanan, B.B. (1990) Shikimate kinase from spinach chloroplasts. Purification, characterization, and regulatory function in aromatic amino acid biosynthesis. *Plant Physiol.* **93**, 758-766.
120. Wong, J.H., Kiss, F., Wu, M.-X. and Buchanan, B.B. (1990) Pyrophosphate fructose-6-P 1-phosphotransferase from tomato fruit: evidence for change during ripening. *Plant Physiol.* **94**, 499-506.
121. Morigasaki, S., Takata, K., Sanada, Y., Wada, K., Yee, B.C., Shin, S. and Buchanan, B.B. (1990) Novel forms of ferredoxin and ferredoxin-NADP reductase from spinach roots. *Arch. Biochem. Biophys.* **283**, 75-80.
122. Marcus, F., Chamberlain, S.H., Chu, C., Masiarz, F.R., Shin, S., Yee, B.C. and Buchanan, B.B. (1991) Plant thioredoxin *h*: an animal-like thioredoxin occurring in multiple cell compartments. *Arch. Biochem. Biophys.* **287**, 195-198.
123. Kiss, F., Wu, M.-X., Wong, J.H., Balogh, A. and Buchanan, B.B. (1991) Redox active sulfhydryls are required for fructose-2,6-bisphosphate activation of plant PFP (PPi fructose-6-phosphate 1-phosphotransferase). *Arch. Biochem. Biophys.* **287**, 337-340.
124. Kobrehel, K., Yee, B.C. and Buchanan, B.B. (1991) Role of the NADP/thioredoxin system in the reduction of α -amylase and trypsin inhibitor proteins. *J. Biol. Chem.* **266**, 16135-16140.
125. Green, L.S., Yee, B.C., Buchanan, B.B., Kamide, K., Sanada, Y. and Wada, K. (1991) Ferredoxin and ferredoxin-NADP reductase from photosynthetic and nonphotosynthetic tissues of tomato. *Plant Physiol.* **96**, 1207-1213.
126. Huppe, H., Picaud, A., Buchanan, B.B. and Miginiac-Maslow, M. (1991) Identification of an NADP/ thioredoxin system in *Chlamydomonas reinhardtii*. *Planta* **186**, 115-121.
127. Wu, M.-X., Wong, J.H., Kiss, F. and Buchanan, B.B. (1991) The regulation of inorganic pyrophosphate D-fructose 6-phosphate 1-phosphotransferase (PFP) from tomato fruits by the thiol-dependent Fru-2,6-P₂ activation. *Acta Phytophysiologica Sinica* **17**, 267-272.
128. Szekeres, M., Droux, M. and Buchanan, B.B. (1991) The ferredoxin/thioredoxin reductase variable subunit gene from *Anacystis nidulans*. *J. Bacteriol.* **173**, 1821-1823.
129. Kobrehel, K., Wong, J.H., Balogh, A., Kiss, F., Yee, B.C. and Buchanan, B.B. (1992) Specific reduction of wheat storage proteins by thioredoxin *h*. *Plant Physiol.* **99**, 919-924.

130. Jiao, J., Yee, B.C., Kobrehel, K. and Buchanan, B.B. (1992) Effect of thioredoxin-linked reduction on the activity and stability of the Kunitz and Bowman-Birk soybean trypsin inhibitor proteins. *J. Agric. Food Chem.* **40**, 2333-2336.
131. Shin, S., Wong, J.H., Kobrehel, K. and Buchanan, B.B. (1993) Reduction of castor-seed 2S albumin protein by thioredoxin. *Planta* **189**, 557-560.
132. Wong, J.H., Kobrehel, K., Nimbona, C., Yee, B.C., Balogh, A, Kiss, F. and Buchanan, B.B. (1993) Thioredoxin and bread wheat. *Cereal Chem.* **70**, 113-114.
133. Hartman, H., Wu, M., Buchanan, B.B. and Gerhart, J.C. (1993) Spinach thioredoxin m inhibits DNA synthesis in fertilized *Xenopus* eggs. *Proc. Natl. Acad. Sci. USA* **90**, 2271-2275.
134. Florencio, F.J., Gadal, P. and Buchanan, B.B. (1993) Thioredoxin-linked activation of the chloroplast and cytosolic forms of *Chlamydomonas reinhardtii* glutamine synthetase. *Plant Physiol. Biochem.* **31**, 649-655.
135. Jiao, J., Yee, B.C., Wong, J.H., Kobrehel, K. and Buchanan, B.B. (1993) Thioredoxin-linked changes in regulatory properties of barley α -amylase/subtilisin inhibitor protein. *Plant Physiol. Biochem.* **31**, 799-804.
136. Lozano, R.M., Yee, B.C. and Buchanan, B.B. (1994) Thioredoxin-linked reductive inactivation of venom neurotoxins. *Arch. Biochem. Biophys.* **309**, 356-362.
137. Vianey-Liaud, N., Kobrehel, K., Sauvaire, Y., Wong, J.H. and Buchanan, B.B. (1994) Lipoic acid in wheat grains. *J. Agric. Food Chem.* **42**, 1110-1114.
138. Melhorne, R.J., Buchanan, B.B. and Leighton, T. (1994) Bacterial chromate reduction and product characterization. In: *Emerging Technology for Bioremediation of Metals* (J. L. Means and R. E. Hinchee, eds.), pp. 26-37, Lewis Publishers, Boca Raton, FL.
139. Buchanan, B.B., Bucher, J.J., Carlson, D.E., Edelstein, N.M., Hudson, E.A., Kaltsoyannis, N., Leighton, T., Lukens, W., Nitsche, H., Reich, T., Roberts, K., Shuh, D.K., Torretto, P., Woicik, J., Yang, W.-S., Yee, A. and Yee, B.C. (1995) A XANES and EXAFS investigation of the speciation of selenite following bacterial metabolization. *Inorg. Chem.* **34**, 1617-1619.
140. Lois, R. and Buchanan, B.B. (1994) Severe sensitivity to ultraviolet radiation in an *Arabidopsis* mutant deficient in flavonoid accumulation. II. Mechanisms of UV-resistance in *Arabidopsis*. *Planta* **4**, 504-509.
141. Garbisu, C., Gonzalez, S., Yang, W.-H., Yee, B.C., Carlson, D.L., Yee, A., Smith, N.R., Otero, R., Buchanan, B.B. and Leighton, T. (1995) Physiological mechanisms regulating the conversion of selenite to elemental selenium by *Bacillus subtilis*. *BioFactors* **5**, 29-37.

142. Garbisu, C., Ishii, T., Smith, N.R., Yee, B.C., Carlson, D.E., Yee, A., Buchanan, B.B. and Leighton, T. (1995) Mechanisms regulating the reduction of selenite by aerobic Gram (+) and Gram (-) bacteria. *Bioremediation Series*. Bioremediation of Inorganics, Battelle Press, Columbus, OH, **3**(10), 125-131.
143. Kamide, K., Sakai, H., Aoki, K., Sanada, Y., Wada, K., Green, L.S., Yee, B.C. and Buchanan, B.B. (1995) Amino acid sequences of heterotrophic and photosynthetic ferredoxins from the tomato plant (*Lycopersicon esculentum* Mill.). *Photosyn. Res.* **46** 301-308.
144. Combs, G.F., Jr., Garbisu, C., Yee, B.C., Yee, A., Carlson, D.E., Smith, N.R., Magyarosy, A.C., Leighton, T. and Buchanan, B.B. (1996) Bioavailability of selenium accumulated by selenite-reducing bacteria. *Biol. Trace Element Res.* **52**, 5203-5209.
145. Lozano, R.M., Wong, J.H., Yee, B.C., Peters, A., Kobrehel, K., and Buchanan, B.B. (1996) New evidence for a role for thioredoxin *h* in germination and seedling development. *Planta* **200**, 100-106.
146. Besse, I., Wong, J.H., Kobrehel, K. and Buchanan, B.B. (1996) Thiocalcin: A thioredoxin-linked, substrate specific protease dependent on calcium. *Proc. Natl. Acad. Sci. USA* **93**, 3169-3175.
147. Gobin, P., Duviiau, M.-P., Wong, J.H., Buchanan, B.B. and Kobrehel, K. (1996) Change in sulfhydryl-disulfide status of wheat proteins during conditioning and milling. *Cereal Chem.* **73**, 495-498.
148. Garbisu, C., Ishii, T., Leighton, T. and Buchanan, B.B. (1996) Bacterial reduction of selenite to elemental selenium. *Chem. Geo.* **132**, 199-204.
149. Conrad, M.E., Daley, P.F., Fischer, M.L., Buchanan, B.B., Leighton, T. & Kashgarian, M. (1997) Combined ¹⁴C and d-¹³C monitoring of *in Situ* biodegradation of petroleum hydrocarbons. *Environ. Sci. & Technol.* **31**, 1463-1469.
150. Buchanan, B.B., Adamidi, C., Lozano, R.M., Yee, B.C., Momma, M., Kobrehel, K., Ermel, R.W. and Frick, O.L. (1997) Thioredoxin-linked mitigation of allergic responses to wheat. *Proc. Natl. Acad. Sci. USA* **94**, 5372-5377.
151. Gobin, P., Ng, P.K.W., Buchanan, B.B. and Kobrehel, K. (1997) Sulfhydryl-disulfide changes in proteins of developing wheat grain. *Plant Physiol. Biochem.* **35**, 777-783.
152. Garbisu, C., Alkorta, I., Carlson, D.E., Leighton, T. and Buchanan, B.B. (1997) Selenite bioremediation potential of indigenous microorganisms from industrial activated sludge. *Microbiologia SEM* **13**, 437-444.
153. del Val, G., Yee, B.C., Lozano, R.M., Buchanan, B.B., Ermel, R.E., Lee, Y.M. and Frick, O.L. (1999) Thioredoxin treatment increases digestibility and lowers allergenicity of milk. *J. Aller. Clin. Immunol.* **103**, 690-697.

154. Cho, M.-J., Choi, H.W., Buchanan, B.B., and Lemaux, P.G. (1999) Inheritance of tissue-specific expression of barely hordein promoter-*uidA* fusions in transgenic barley plants. *Theo. Appl. Genet.* **98**, 1253-1262.
155. Chemla, Y.R., Grossman, H.L., Lee, T.S., Clarke, J., Adamkiewicz, M. and Buchanan, B.B. (1999) A new study of bacterial motion: superconducting quantum interference device microscopy of magnetotactic bacteria. *Biophys. J.* **76**, 3323-3330.
156. Garbisu, C., Carlson, D., Adamkiewicz, M., Yee, B.C., Wong, J.H., Resto, E., Leighton, T. and Buchanan, B.B. (1999) Morphological and biochemical responses of *Bacillus subtilis* to selenite stress. *BioFactors* **10**, 311-319.
157. Cho, M.-J., Wong, J.H., Marx, C., Jiang, W., Lemaux, P.G. and Buchanan, B.B. (1999) Overexpression of thioredoxin *h* leads to enhanced activity of starch debranching enzyme (pullulanase) in barley grain. *Proc. Natl. Acad. Sci. USA* **96**, 14641-14646.
158. del Val, G, Jung H.R., Morigasaki, S., Buchanan B.B. and Frick, O.L. (2000) Reevaluation of the allergenicity of proteins from the lipid-soluble fraction of ragweed pollen. *J. Aller. Clin. Immunol.* **105**, 980.
159. Yano, H., Wong, J.H., Lee, Y.M., Cho, M.-J. and Buchanan, B.B. (2001) A strategy for the identification of proteins targeted by thioredoxin. *Proc. Natl. Acad. Sci. USA* **98**, 4794-4799.
160. Yano, H., Wong, J.H., Cho, M.-J. and Buchanan, B.B. (2001) Redox changes accompanying the degradation of seed storage proteins in germinating rice. *Plant Cell Physiol.* **42**, 879-883.
161. Buchanan, B.B. (2002) Thioredoxin: A photosynthetic regulatory protein finds application in food improvement. *J. Sci. Food Agric.* **82**, 45-52.
162. del Val, G., Hagie, F.E., Jr. and Buchanan, B.B. (2002) Thioredoxin-(dithiol)-linked inactivation of elastase. *Mol. Immunol.* **38**, 759-763.
163. Teuber, S.S., del Val, G., Morigasaki, S., Jung, H.R., Eisele, P.H., Frick, O.L. and Buchanan, B.B. (2002) The atopic dog as a model of peanut and tree nut food allergy. *J. Aller. Clin. Immunol.* **110**, 921-927.
164. Wong, J.H., Kim, Y.-B., Ren, P.-H., Cai, N., Cho, M.-J., Hedden, P., Lemaux, P.G. and Buchanan, B.B. (2002) Transgenic barley grain overexpressing thioredoxin shows evidence that the starchy endosperm communicates with the embryo and aleurone. *Proc. Natl. Acad. Sci. USA* **99**, 16325-16330.
165. Marx, C., Wong, J.H. and Buchanan, B.B. (2003) Thioredoxin and germinating barley: targets and protein redox changes. *Planta* **216**, 454-460.
166. Balmer, Y., Koller, A., del Val, G., Manieri, W., Schürmann, P. and Buchanan, B.B. (2003) Proteomics gives insight into the regulatory function of chloroplast thioredoxins. *Proc. Natl. Acad. Sci. USA* **100**, 370-375.

167. Wong, J.H., Balmer, Y., Cai, N., Tanaka, C.K., Vensel, W.H., Hurkman, W.J. and Buchanan, B.B. (2003) Unraveling thioredoxin-linked metabolic processes of cereal starchy endosperm using proteomics. *FEBS Lett.* **547**, 151-156.
168. Kim, Y.B., Garbisu, C., Pickering, I.J., Prince, R.C., George, G.N., Cho, M.-J., Wong, J.H. and Buchanan, B.B. (2003) Thioredoxin *h* overexpressed in barley seeds enhances selenite resistance and uptake during germination and early seedling development. *Planta* **218**, 186-191.
169. Balmer, Y., Koller, A., del Val, G., Schürmann, P. and Buchanan, B.B. (2004) Proteomics uncovers proteins interacting electrostatically with thioredoxin in chloroplasts. *Photosyn. Res.* **79**, 275-280.
(Special Issue to honor P. Schürmann and M. Miginiac-Maslow on their retirement.)
170. Wong, J.H., Cai, N., Tanaka, C.K., Vensel, W.H., Hurkman, W.J. and Buchanan, B.B. (2004) Thioredoxin reduction alters the solubility of proteins of wheat starchy endosperm: An early event in cereal germination. *Plant Cell Physiol.* **45**, 407-415.
(Dedicated to K. Wada on his retirement from Kanazawa University.)
171. Balmer, Y., Vensel, W.H., Tanaka, C.K., Hurkman, W.J., Gelhaye, E., Rouhier, N., Jacquot, J.-P., Manieri, W., Schürmann, P., Droux, M. and Buchanan, B.B. (2004) Thioredoxin links redox to the regulation of fundamental processes of plant mitochondria. *Proc. Natl. Acad. Sci. USA* **101**, 2642-2647.
172. Cho, M.-J., Yano, H., Okamoto, D., Kim, H.K., Jung, H.R., Newcomb, K., Le, V.K., Yoo, H.S., Langham, R., Buchanan, B.B. and Lemaux, P.G. (2004) Stable transformation of rice (*Oryza sativa* L.) via microprojectile bombardment of highly regenerative tissues derived from mature seed. *Plant Cell Rep.* **22**, 483-490.
173. Wong, J.H., Cai, N., Balmer, Y., Tanaka, C.K., Vensel, W.H., Hurkman, W.J. and Buchanan, B.B. (2004) Thioredoxin targets of developing wheat seeds identified by complementary proteomic approaches. *Phytochem.* **65**, 1629-1640.
(Special Proteomics Issue.)
174. Gopalan, G., He, Z., Balmer, Y., Romano, P., Gupta, R., Héroux, A., Buchanan, B.B., Swaminathan, K. and Luan, S. (2004) Structural analysis uncovers a role for redox in regulating FKBP13, an immunophilin of the chloroplast thylakoid lumen. *Proc. Natl. Acad. Sci. USA* **101**, 13945-13950.
175. Kim, Y.-B., Park, K.Y., Chung, Y., Oh, K.-C. and Buchanan, B.B. (2004) Phytoremediation of anthracene contaminated soils by different plant species. *J. Plant Biol.* **47**, 174-178.
176. Frick, O.L., Teuber, S.S., Buchanan, B.B., Morigasaki, S. and Umetsu, D.T. (2005) Allergen immunotherapy with heat-killed *Listeria monocytogenes* alleviates peanut and food-induced anaphylaxis in dogs. *Allergy* **60**, 243-250.
177. Vensel, W.H., Tanaka, C.K., Cai, N., Wong, J.H., Buchanan, B.B. and Hurkman, W.J. (2005) Developmental changes in the metabolic protein profiles of wheat endosperm. *Proteomics* **5**, 1594-1611.

178. Balmer, Y., Vensel, W.H., Dupont, F.M., Buchanan, B.B., Hurkman, W.J. (2006) Proteome of amyloplasts isolated from developing wheat endosperm presents evidence of broad metabolic capability. *J. Exp. Bot.* **57**, 1591-1602.
179. Balmer, Y., Vensel, W.H., Cai, N., Manieri, W., Schürmann, P., Hurkman, W.J., Buchanan, B.B. (2006) A complete ferredoxin/thioredoxin system regulates fundamental processes in amyloplasts. *Proc. Natl. Acad. Sci. USA* **103**, 2988-2993.
180. Balmer, Y., Vensel, W.H., Hurkman, W.J. and Buchanan, B.B. (2006) Thioredoxin target proteins in chloroplast thylakoid membranes. *Antioxid. Redox. Signal.* **8**, 1829-2834.
181. Sokolov, L.N., Dominguez-Solis, J.R., Allary, A.-L., Buchanan, B.B. and Luan, S. (2006) A redox-regulated protein phosphatase binds to starch diurnally and functions in its accumulation. *Proc. Natl. Acad. Sci. USA* **103**, 9732-9737.
182. Lima, A., Lima, S., Phillips, R.S., Wong, J.H., Buchanan, B.B. and Luan, S. (2006) A redox-active FKBP-type immunophilin functions in accumulation of the photosystem II supercomplex in *Arabidopsis thaliana*. *Proc. Natl. Acad. Sci. USA* **103**, 12631-12636.
183. Hajheidari, M., Eivazi A., Buchanan, B.B., Wong, J.H., Majidi, I. and Salekdeh, G.H. (2007) Proteomics uncovers a role for redox in drought tolerance in wheat. *J. Proteome Res.* **6**, 1451-1460.
184. Alkhalfioui, F., Renard, M., Vensel, W.H., Wong, J., Tanaka, C.K., Hurkman, W.J., Buchanan, B.B. and Montrichard, F. (2007) Thioredoxin-linked proteins are reduced during germination of *Medicago truncatula* seeds. *Plant Physiol.* **144**, 1559-1579.
185. Fu, A., He, Z., Cho, H.S., Lima, A., Buchanan, B.B. and Luan, S. (2007) A chloroplast cyclophilin functions in the assembly and maintenance of photosystem II in *Arabidopsis thaliana*. *Proc. Natl. Acad. Sci. USA* **104**, 15947-15952.
186. Lee, S.C., Lan, W.-Z., Kim, B.-G., Li, L., Pandey, G.K., Lu, G., Buchanan, B.B. and Luan, S. (2007) A protein phosphorylation/dephosphorylation network regulates a plant potassium channel. *Proc. Natl. Acad. Sci. USA* **104**, 15959-15964.
187. Dominguez-Solis, J. R., He, Z., Lima, A., Ting, J., Buchanan, B.B., Luan S. (2008) A cyclophilin links redox and light signals to cysteine biosynthesis and stress responses in chloroplasts. *Proc. Natl. Acad. Sci. USA* **105**, 16386-16391.
188. Balsera, M., Goetze, T.A., Kovács-Bogdán, E., Schürmann, P., Wagner, R., Buchanan, B.B., Soll, J., Bölter, B. (2008) Characterization of Tic110, a channel-forming protein at the inner envelope membrane of chloroplasts, unveils a response to Ca²⁺ and a stromal regulatory disulfide bridge. *J. Biol. Chem.* **284**, 2603-2616.
189. Wong, J. H., Lau, T., Cai, N., Singh, J., Pedersen, J. F., Vensel, W. H., Hurkman, W. J., Lemaux, P. G. and Buchanan, B. B. (2008) Digestibility of protein and starch from sorghum (*Sorghum bicolor*) is linked to biochemical and structural features of grain endosperm. *J. Cereal Sci.* **49**, 73-82.

190. Li, Y., Ren, J., Cho, M.-J., Zhou, S., Kim, Y.-B, Guo, H., Wong, J.H., Niu, H., Kim, H.K., Morigasaki, S., Lemaux, P.G., Frick, O.L., Yin, J. and Buchanan, B.B. (2009) The level of expression of thioredoxin is linked to fundamental properties and applications of wheat seeds. *Mol. Plant* **2**, 430-441.
191. Michalska, J., Zaubner, H., Buchanan, B.B., Cejudo, F.J. and Geigenberger, P. (2009) NTRC links built-in thioredoxin to light and sucrose in regulating starch synthesis in chloroplasts and amyloplasts. *Proc. Natl. Acad. Sci. USA* **106**, 9908-9913.
192. Lan W., Lee, S.C., Buchanan, B.B. and Luan, S. (2009) A protein kinase-phosphatase pair interacts with an ion channel to regulate ABA signaling in plant guard cells. *Proc. Natl. Acad. Sci. USA* **106**, 21419-21424.
193. Stengel, A., Benz, J.P., Buchanan, B.B., Soll, J. and Bölder, B. (2009) Preprotein import into chloroplasts via the Toc and Tic complexes is regulated by redox signals. *Mol. Plant*. **2**, 1118-1197.
194. Meng, L., Wong, J.H., Feldman, L.J., Lemaux, P.G. and Buchanan, B.B. (2010) A membrane-associated thioredoxin required for plant growth moves from cell-to-cell suggestive of a role in intercellular communication. *Proc. Natl. Acad. Sci. USA* **107**, 3900-3905.
195. Lan, W., Wang, W., Wang, S., Gao, J., Buchanan, B.B., Lin, H., and Luan, S. (2010) A high-affinity potassium transporter (HKT) in rice conceals a calcium-permeable cation channel. *Proc. Natl. Acad. Sci. USA*. **107**, 7089-7094.
196. Meng, L., Buchanan, B.B., Feldman, L.J. and Luan, S. (2012) CLE-like (CLEL) peptides control the pattern of root growth and lateral root development in Arabidopsis. *Proc. Natl. Acad. Sci. USA*. **109**, 1760-1765.
197. Meng, L., Buchanan, B.B., Feldman, L.J. and Luan, S. (2012) A Putative Nuclear CLE-Like (CLEL) Peptide Precursor Regulates Root Growth in Arabidopsis. *Mol. Plant* **5**, 955-957.
198. Wong, J.H., Pedersen, J.F., Buchanan, B.B. and Lemaux, P.G. (2012) Western Blot Analysis Uncovers Clues to Prolamin Digestibility in Raw and Cooked Meal from Sorghum and Corn. *Eur. J. Plant Sci. Biotech.* **6**, 56-65.
199. Yu, F., Qian, L., Nibau, C., Duan, Q., Kita, D., Levasseur, K., Li, X., Lu, C., Li, H., Hou, C., Li, L., Buchanan, B.B., Chen, L., Cheung, A.Y., Li, D. and Luan, S. (2012) FERONIA Receptor Kinase Pathway Suppresses Abscisic Acid Signaling in *Arabidopsis* by Activating ABI2 Phosphatase. *Proc. Natl. Acad. Sci. USA*. **109**, 14693-14698.
200. Balsera, M., Uberegui, E., Susanti, D., Schmitz, R.A., Mukhopadhyay, B., Schürmann, P. and Buchanan, B.B. (2012) Ferredoxin:thioredoxin reductase (FTR) links the regulation of oxygenic photosynthesis to deeply rooted bacteria. *Planta* **237**, 619-635

201. Ming, R., VanBuren, R., Liu, Y., Yang, M., Han, Y., Li, L.-T., Zhang, Q., Kim, M.-J., Schatz, M.C., Campbell, M., Li, J., Bowers, J.E., Tang, H., Lyons, E., Ann A. Ferguson, A.A., Narzisi, G., Nelson, D.R., Blaby-Haas, C.E., Gschwend, A.R., Jiao, Y., Der, J.P., Zeng, F., Han, J., Jia, X., Min, X.J., Hudson, K.A., Singh, R., Grenna, A.K., Karpowicz, S.J., Watling, J.R., Ito, K., Robinson, S.A., Hudson, M.E., Yu, Q., Mockler, T.C., Carroll, A., Zheng, Y., Sunkar, R., Jia, R., Chen, N., Arro, J., Wai, C.M., Wafula, E., Spence, A., Han, Y., Xu, L., Zhang, J., Peery, R., Haus, M.J., Xiong, W., Walsh, J.A., Wu, J., Wang, M.-L., Zhu, Y.J., Paull, R.E., Britt, A.B., Du, C., Downie, S.R., Schuler, M.A., Michael, T.P., Long, S.P., Ort, D.R., Schopf, J.W., Gang, D.R., Jiang, N., Yandell, M., dePamphilis, C.W., Merchant, S.S., Paterson, A.H., Buchanan, B.B., Li, S. and Shen-Miller, J. (2013) Genome of the long-living sacred lotus (*Nelumbonucifera* Gaertn.) *Genome Biology* **14**:R41
202. Che, Y., Fu, A., Hou, X., McDonald, K., Buchanan, B.B., Huang, W. and Luan, S. (2013) C-terminal processing of reaction center protein D1 is essential for the function and assembly of photosystem II in Arabidopsis. *Proc. Natl. Acad. Sci. USA*. **110**, 16247-16252.
203. Susanti, D., Wong, J.H., Vensel, W.H., Loganathan, U., DeSantis, R., Schmitz, R.A., Balsera, M., Buchanan, B.B. and Mukhopadhyay, B. (2014) Thioredoxin targets fundamental processes in a methane-producing archaeon, *Methanocaldococcus jannaschii*. *Proc. Natl. Acad. Sci. USA*. **111**, 2608-2613.
204. Hou, Xin, Fu, A., Veder, J.G. Buchanan, B.B. and Luan, S. (2015) PSB27: A thylakoid protein enabling Arabidopsis to adapt to changing light intensity. *Proc. Natl. Acad. Sci. USA*. **112**, 1613-1618.
205. Daloso, D.M., Müller K., Obata, T., Florian, A., Tohge, T., Bottcher, A., Riondet, C., Bariat, L., Carrari, F., Nunes-Nesi, A., Buchanan, B.B., Reichheld, J.-P., Araújo, W.L. and Fernie, A.R. (2015) Thioredoxin, a master regulator of the tricarboxylic acid cycle in plant mitochondria *Proc. Natl. Acad. Sci. USA*. **112**, E1392-400.
206. Gütle DD, Roret T, Müller SJ, Couturier J, Lemaire SD, Hecker A, Dhalleine T, Buchanan BB, Reski R, Einsle O, Jacquot JP. 2016 Chloroplast FBPase and SBPase are thioredoxin-linked enzymes with similar architecture but different evolutionary histories. *Proc. Natl. Acad. Sci. USA*. **113**, 6779-6784.
207. Rubén M. Buey, Sergio Galindo-Trigo, Luis López-Maury, Adrián Velázquez- Campoy, José Luis Revuelta, F. Javier Florencio, José M. de Pereda, Peter Schürmann, Bob B. Buchanan, Monica Balsera 2016 A Novel Thioredoxin Reductase from Cyanobacteria. *Mol. Plant* In Press

Selected Reviews

1. Buchanan, B.B. and Arnon, D.I. (1970) Ferredoxins: Chemistry and function in photosynthesis, nitrogen fixation, and fermentative metabolism. *Adv. Enzymol.* **33**, 119-176
2. Buchanan, B.B. (1980) Role of light in the regulation of chloroplast enzymes. *Annu. Rev. Plant Physiol.* **31**, 341-374.

3. Buchanan, B.B. and Arnon, D.I. (1990) A reverse KREBS cycle in photosynthesis: consensus at last. *Photosyn. Res.* **24**, 47-53 Buchanan, B.B. and Arnon, D.I. (1990) A reverse KREBS cycle in photosynthesis: consensus at last. *Photosyn. Res.* **24**, 47-53
4. Buchanan, B.B. (1991) Regulation of CO₂ assimilation in oxygenic photosynthesis: the ferredoxin/thioredoxin system. Perspective on its discovery, present status and future development. *Arch. Biochem. Biophys.* **288**, 1-9.
5. Buchanan, B.B., Schürmann, P., Decottignies, P. and Losano, R.M. (1994) Thioredoxin: a multifunctional regulatory protein with a bright future in technology and medicine. *Arch. Biochem. Biophys.* **314**, 257-260 [Cover feature].
6. Besse, I. and Buchanan, B.B. (1997) Thioredoxin-linked plant and animal processes: the new generation. *Bot. Bull. Acad. Sin. (Taipei)* **38**, 1-11.
7. Buchanan, B.B. (2001) Genetic engineering and the allergy issue. *Plant Physiol.* **126**, 5-7.
8. Buchanan, B.B., Schürmann, P., Wolosiuk, R.A. and Jacquot, J.P. (2002) The ferredoxin/thioredoxin system: from discovery to molecular structures and beyond. *Photosyn. Res.* **73**, 215-222.
9. Yano, H., Kuroda, S. and Buchanan, B.B. (2002) Disulfide proteome and the analysis of protein function and structure. *Proteomics* **2**, 1090-1096.
10. Buchanan, B.B. and Balmer, Y. (2005) Redox regulation: A broadening horizon. *Ann. Rev. Plant Biol.* **56**, 187-220.
11. Buchanan, B.B. and Luan, S. (2005) Redox regulation in the chloroplast thylakoid lumen: A new frontier in photosynthesis research. *J. Exp. Botany* **56**, 1439-1447.
12. Schürmann P. and Buchanan B. B. (2008) The ferredoxin/thioredoxin system of oxygenic photosynthesis. *Antioxid. Redox Signal.* **10**, 1235-1274.
13. Montrichard, F., Alkhalfioui, F., Yano, H., Vensel, W.H., William J. Hurkman, W. J., and Buchanan, B. B. (2008) Thioredoxin targets in plants: The first 30 years. *Proteomics* **72**, 452-474.
14. Meyer, Y., Buchanan, B.B, Vignols, F. and Reichheld , J.P. (2009) Thioredoxins and Glutaredoxins: Unifying elements in redox biology. *Annu. Rev. Genetics* **43**, 335-367.
15. Buchanan, B.B., Holmgren, A., Jacquot, J.-P. and Scheibe, R. (2012) Fifty years in the thioredoxin field and a bountiful harvest. *Biochim. Biophys. Acta* **1820**, 1822-1829.
16. Balsera, M., Uberegui, E., Schürmann, P. and Buchanan, B.B. (2014) Evolutionary Development of Redox Regulation in Chloroplasts. *Antioxid. Redox Signal.* **21**, 1327-1355.
17. Hägglund, P. Finnie, C., Yano, H., Shahpiri, A., Buchanan, B.B., Henriksen, A., and Svensson, B. (2016) Seed thioredoxin h. *Biochim. Biophys. Acta* **1864**, 974-982.

Historical Articles/Video

1. Buchanan, B.B. (2001) Daniel I. Arnon 1910 – 1994. A Biographical Memoir. *Biographical Memoirs*, volume 80. The National Academy Press, Washington, D.C.
2. Lichtenthaler, H.K., Buchanan, B.B., and Douce R. (2008) [Honoring Andrew Benson in Paris : a tribute on his 90th birthday](#). *Photosynth Res.* **96**, 181-183.
3. Buchanan, B.B., Wong, J.H. (2012) A conversation with Andrew Benson: Reflections on the discovery of the Calvin-Benson cycle. *Photosyn. Res.* **114**, 207–214.
http://www.youtube.com/watch?v=GfQQJ2vR_xE
4. Buchanan, B.B. and Douce, R. (2015) Andrew Benson honored on birthday No. 97. *Photosyn. Res.* **123**, 115-116.
5. Buchanan, B.B. (2015) Further words from Professor Benson.
https://www.youtube.com/watch?v=c4jiYk-W_30
6. Lichtenthaler, H.K., Buchanan, B.B., Douce, R. and Govindjee. (2015) Andrew A. Benson, 1917 – 2015. *Photosyn. Res.* **124**, 131-135.
8. Buchanan, B.B. (2015) Sydney Govons Kustu 1943 - 2014. A Biographical Memoir.
<http://www.nasonline.org/publications/biographical-memoirs/memoir-pdfs/kustu-sydney.pdf>
9. Buchanan, B.B. (2016) The carbon (formerly dark) reactions of photosynthesis. *Photosyn. Res.* **128**, 215-217.
10. Buchanan, B.B. (2016) The path to thioredoxin and redox regulation in chloroplasts. *Ann. Rev. Plant Biol.* **67**, 1-24

Special Issue of Journal Issue to Honor B. B. Buchanan

Redox regulation and photosynthesis. (2013) *Mol. Plant* 7, Issue 1 pp. 1 – 259. Foreword by B. B. Buchanan. The birth of redox regulation, pp. 123.

Special Issues of Journals Edited or Co-edited

1. Buchanan, B.B. (1985) Editor, Special Issue of *Physiologie Végétale* Dedicated to D.I. Arnon, Vol. 23, No. 23, No. 5, pp. 503-875.
2. Melis, A. and Buchanan, B.B. (1995) Editors, A Tribute to Daniel I. Arnon, Special Issue of *Photosynthesis Research*. Vol. 46, Nos. 1 - 2, November, 1995.
3. Migniac-Maslow, M., Buchanan, B.B. and Vidal, J. (2003) Editors, Special Issue of *Plant Physiology and Biochemistry*, Dedicated to Pierre Gadal. Vol. 41, pp. 505-676.
4. Buchanan, B.B., Knaff, D.B. and Jacquot, J.-P. (2004) Editors, Plant Thioredoxin and Related Proteins, Special Issue of *Photosynthesis Research* Dedicated to Peter Schürmann and Myroslawa Migniac-Maslow, Vol. 79, No. 3, pp. 225-373.
5. Buchanan, B.B., Douce, R. and Lichtenthaler, H K. (2007) Editors, A Tribute to Andrew A. Benson, Special Issue of *Photosynthesis Research*, Vol. 92, No. 2, pp. 142-271.

6. Buchanan, B.B, Dietz, K.-J., Geigenberger, P., Jacquot, J.-P., and Schürmann, P. (2009) Editors, Special Issue on Redox Biology. *Molecular Plant* Vol. 2, No. 2, March 2009
7. Buchanan, B.B., Dietz, K.-J., Geigenberger, P., Jacquot, J.-P., and Schürmann, P. (2009) Editors, Redox Biology II Special Issue of *Molecular Plant*. Vol. 2, No. 3, May 2009.

Book Chapters and Congress Proceedings

1. Buchanan, B.B., Evans, M.C.W. and Arnon, D.I. (1965) Ferredoxin-dependent pyruvate synthesis by enzymes of photosynthetic bacteria. In: *Non-Heme Iron Proteins: Role in Energy Conversion* (San Pietro, A., ed.), pp. 175-188 Antioch Press, Yellow Springs, Ohio
2. Buchanan, B.B. (1966) The chemistry and function of ferredoxin. In: *Structure and Bonding* (Jorgensen, C.K., Neilands, J.B., Nyholm, R.S., Reinen, D., Williams, R.J.P., eds.), pp. 109-148, Springer-Verlag, Berlin
3. Buchanan, B.B. and Arnon, D.I. (1967) Ferredoxin in plant and bacterial photosynthesis. Colloquium on Metal Binding Proteins, Brugge, Belgium, 1966. In: *Protides of the Biological Fluids*(Peeters, H., ed.), Vol. 14 , pp. 143-158, Elsevier Publ. Co., NY
4. Buchanan, B.B. and Arnon, D.I. (1969) The reductive carboxylic acid cycle. *Methods Enzymol.* **13**, 170-181
5. Buchanan, B.B. (1972) Ferredoxin-linked carboxylation reactions. In: *The Enzymes*, 3rd ed. (Boyer, D., ed.), Vol. 6, pp. 193-216, Academic Press, NY
6. Schürmann, P., Buchanan, B.B. and Arnon, D.I. (1972) Role of cyclic photophosphorylation in photosynthetic carbon dioxide assimilation by isolated chloroplasts. Proc. II International Congress of Photosynthesis, Stresa, Italy, 1971 (Forti, G., Avron, M., Melandri, A., eds.), pp. 1283-1291, Junk, The Hague
7. Buchanan, B.B. (1973) Ferredoxin and carbon assimilation. In: *Iron-Sulfur Proteins* (Lovenberg, W., ed.), pp. 129-150, Academic Press, NY
8. Buchanan, B.B. and Schürmann P. (1973) Ribulose 1,5-diphosphate carboxylase: A regulatory enzyme in the photosynthetic assimilation of carbon dioxide. In: *Current Topics in Cellular Regulation*, Vol. 7, (Horecker, B.L., Stadtman, E.R. eds.), pp. 1-20, Academic Press, NY
9. Arnon, D.I. and Buchanan, B.B. (1974) Ferredoxins and photosynthesis In: *Horizons in Biochemistry and Biophysics* (Quagliariello, E., Palmieri, F., Singer, T.P., eds.), Vol. 1, pp. 303-344 Addison-Wesley Publ. Co., Reading, Mass
10. Buchanan, B.B. (1975) Ferredoxin-activated fructose 1,6-diphosphatase system of spinach chloroplasts. *Methods Enzymol.* **42**, 397-405
11. Klingenberg, H., Aquila, P., Riccio, P., Buchanan, B.B., Eiermann, W. and Hackenberg, H. (1975) Characterization of the isolated ADP, ATP carrier. In: *Electron Transfer Chains and*

Oxidative Phosphorylation (Quagliariello, E., Papa, S., Palmieri, F., Slater, E.C., Siliprandi, N., eds.), pp. 431-438, North-Holland Publ. Co., Amsterdam

12. Klingenberg, M., Riccio, P., Aquila, H., Buchanan, B.B. and Grebe, K. (1976) Mechanism of carrier transport and the ADP, ATP carrier. In: The Structural Basis of Membrane Function (Hatefi, Y., Djavadi-Ohanian, L., eds.), pp. 293-311, Academic Press, Inc., NY
13. Buchanan, B.B. (1979) Ferredoxin-linked carbon dioxide fixation in photosynthetic bacteria. In: Photosynthesis II, Photosynthetic Carbon Metabolism and Related Processes (Gibbs, M., Latzko, E., eds.), Encyclopedia of Plant Physiology, New Series, Vol. 6 (Pirson, A., Zimmerman, M.H., eds.), pp. 416-424, Springer-Verlag, NY
14. 121a. Wolosiuk, R.A., Schürmann, P. and Buchanan, B.B. (1980) Thioredoxin and ferredoxin-thioredoxin reductase of spinach chloroplasts. *Methods Enzymol.* **69C**, 382-391
15. Buchanan, B.B. (1980) Enzyme regulation by reduction/oxidation. In: The Enzymology of Post-Translational Modifications of Proteins (Freeman, R.B., ed.), pp. 345-362, Academic Press, Inc., London
16. Wolosiuk, R.A., Schürmann, P. and Buchanan, B.B. (1980) Thioredoxin and ferredoxin-thioredoxin reductase of spinach chloroplasts. In: Methods in Enzymol (Colowick, S.P., Kaplan, N.O., eds.), Vol. 69c, Photosynthesis and Nitrogen Fixation, Part C (San Pietro, A., ed.), pp. 382-391, Academic Press, NY
17. Buchanan, B.B. (1981) Photosynthetic enzyme regulation by the ferredoxin/thioredoxin and the ferralaterin mechanisms. In: Photosynthesis IV, Regulation of Carbon Metabolism (Akoyunoglou, G., ed.), pp. 245-256, Balaban International Science Services, Philadelphia, PA
18. Buchanan, B.B., Hutcheson, S.W., Magyarosy, A.C. and Montalbini, P. (1981) Photosynthesis in healthy and diseased plants. In: Effects of Disease on the Physiology of the Growing Plant (Ayres, P.G., ed.), Vol. 11, pp. 13-28, S.E.B. Seminar Series, Cambridge University Press, USA
19. Nishizawa, A.N., Yee, B.C. and Buchanan, B.B. (1982) Chloroplast fructose-1,6-bisphosphatase from spinach leaves. In: Methods in Chloroplast Molecular Biology, (Edelman, M. Hallick, R.B, Chua, N.-H., eds.), pp. 707-714, Elsevier Biomedical Press, NY
20. Crawford, N.A., de la Torre, A., Lara, C. and Buchanan, B.B. (1982) Chloroplast ferredoxin-thioredoxin reductase, thioredoxin *f* and thioredoxin *m* from spinach leaves. In: Methods in Chloroplast Molecular Biology, (Edelman, M. Hallick, R.B, Chua, N.-H., eds.), pp. 735-747, Elsevier Biomedical Press, NY
21. Bassham, J.A. and Buchanan, B.B. (1982) Carbon dioxide fixation pathways in plants and bacteria. In: Photosynthesis, Development, Carbon Metabolism and Plant Productivity (Govindjee, ed.), Vol. II, pp. 141-189, Academic Press, NY

22. Buchanan, B.B. (1982) Carbon dioxide assimilation in photosynthetic bacteria. In: Handbook of Biosolar Resources (Zaborsky, O.R., ed.), Vol. I (1), pp. 175-180, CRC Press, Boca Raton, Florida
23. Hutcheson, S.W. and Buchanan, B.B. (1983) Bioenergetic and metabolic disturbances in diseased plants. In: Biochemical Plant Pathology (Callow, J. A., ed.), Ch. 15, pp. 327-345, John Wiley & Sons Ltd, London
24. Hammel, K.E. and Buchanan, B.B. (1983) The ferredoxin/thioredoxin system of a fermentative bacterium. In: Thioredoxins, Structure and Functions, Centre National de la Recherche Scientifique, Paris, International Conference CNRS-NASA (Gadal, P., ed.), pp. 69-77, Berkeley, CA
25. Wada, K. and Buchanan, B.B. (1983) Purothionins and related proteins: Seed proteins with thioredoxin activity. In: Thioredoxins, Structure and Functions, Centre National de la Recherche Scientifique, Paris, International Conference CNRS-NASA (Gadal, P., ed.), pp. 213-219, Berkeley, CA
26. Crawford, N.A., Yee, B.C., de la Torre, A., Lara, C., Carlson, D.E. and Buchanan, B.B. (1983) The ferredoxin/thioredoxin system of enzyme regulation in a cyanobacterium. In: Thioredoxins, Structure and Functions, Centre National de la Recherche Scientifique, Paris, International Conference CNRS-NASA (Gadal, P., ed.), pp. 191-198, Berkeley, CA
27. Hutcheson, S.W., Crawford, N.A., Buchanan, B.B. and Jacquot, J.-P. (1983) The ferredoxin/thioredoxin system of a C₄ plant. In: Thioredoxins, Structure and Functions, Centre National de la Recherche Scientifique, Paris, International Conference CNRS-NASA (Gadal, P., ed.), pp. 235-243, Berkeley, CA
28. Buchanan, B.B. (1983) Role of Thioredoxins and Related Proteins in Photosynthetic Enzyme Regulation. In: Functions of Glutathione: Biochemical, Physiological, Toxicological and Clinical Aspects (Larsson, A., et al., eds.), pp. 231-242, Raven Press, NY
29. Soll, J., Wötzel, C.D. and Buchanan, B.B. (1984) Fructose 2,6-bisphosphate and C₄ plants. In: Advances in photosynthesis research, Proc. VIth International Congress on Photosynthesis, August 1-6, 1983, (Sybesma, C., ed.), pp. 485-488, Brussels, Belgium, Nijhoff/Junk, The Netherlands
30. Sutton, C.W., Crawford, N.A., Yee, B.C., Carlson, D.E. and Buchanan, B.B. (1984) Role of the ferredoxin/thioredoxin system in the regulation of photosynthetic enzymes in a cyanobacterium. In: Advances in Photosynthesis Research, Proc. VIth International Congress on Photosynthesis, August 1-6, 1983 (Sybesma, C., ed.), Vol. III, pp. 633-636, Brussels, Belgium, Nijhoff/Junk, The Netherlands
31. Buchanan, B.B. (1984) Enzyme regulation in photosynthesis. In: Advances in Photosynthesis Research, Proc. VIth International Congress on Photosynthesis, August 1-6, 1983 (Sybesma, C., ed.), Vol III, pp. 573-580, Brussels, Belgium, Nijhoff/Junk, The Netherlands

32. Stitt, M., Herzog, B., Gerhardt, R., Kurzel, B., Heldt, W., Cséke, C. and Buchanan, B.B. (1984) Regulation of photosynthetic sucrose synthesis by fructose 2,6-bisphosphate. In: Advances in Photosynthesis Research, Proc. VIth International Congress on Photosynthesis, August 1-6, 1983 (Sybesma, C., ed.), Vol III, pp. 609-611, Brussels, Belgium, Nijhoff/Junk, The Netherlands
33. Cséke, C., Balogh, A. and Buchanan, B.B. (1984) Regulation of the synthesis and breakdown of fructose-1,6-bisphosphate in leaves. In: Advances in Photosynthesis Research, Proc. VIth International Congress on Photosynthesis, August 1-6, 1983 (Sybesma, C., ed.), Vol IV, pp. 633-636, Brussels, Belgium, Nijhoff/Junk, The Netherlands
34. Cao, R.Q., Johnson, T.C. Kung, J.E. and Buchanan, B.B. (1984) Developmental studies on plant thioredoxin systems. In: Advances in Photosynthesis Research, Proc. VIth International Congress on Photosynthesis, August 1-6, 1983 (Sybesma, C., ed.), Vol IV, pp. 877-880, Brussels, Belgium, Nijhoff/Junk, The Netherlands
35. Buchanan, B.B. (1986) The ferredoxin/thioredoxin system. In: Thioredoxin and glutaredoxin systems: structure and function (Holmgren, A. et al., eds.), pp. 233-242, Raven Press, NY
36. Macdonald, F.D., Wong, J.H., Cséke, C., Kang, T. and Buchanan, B.B. (1986) The Regulation of Enzymes of Sucrose Metabolism in Plant Sinks, In: Biological Control of Photosynthesis (R. Marcelle et al., eds.), pp. 93-104, Martinus Nijhoff, Netherlands
37. Miginiac-Maslow, M., Droux, M., Jacquot, J.-P., Crawford, N.A., Yee, B.C. and Buchanan, B.B. (1987) Studies on enzyme photoactivation by the ferredoxin/thioredoxin system. In: Progress in Photosynthesis Research, Proc. VIIth International Congress on Photosynthesis, August 10-15, 1986 (Biggins, J., ed.), Vol. III, pp. 241-247, Martinus Nijhoff, Boston
38. Droux, M., Jacquot, J.-P., Miginiac-Maslow, M., Gadal, P., Crawford, N.A., Yee, B.C. and Buchanan, B.B. (1987) Ferredoxin-thioredoxin reductase: an iron-sulfur enzyme linking light to enzyme regulation in chloroplasts. In: Progress in Photosynthesis Research, Proc. VIIth International Congress on Photosynthesis, August 10-15, 1986, Providence, RI, (Biggins, J., ed.), Vol. III, pp. 249-252, Martinus Nijhoff, Boston
39. Crawford, N.A., Kosower, N.S. and Buchanan, B.B. (1987) Effect of light on the thiol status of chloroplasts. In: Progress in Photosynthesis Research, Proc. VIIth International Congress on Photosynthesis, August 10-15, 1986, Providence, RI, USA (Biggins, J., ed.), Vol. III, pp. 253-256, Martinus Nijhoff, Boston
40. Huppe, H.C., Buchanan, B.B. Christophe de Lamotte-Guéry, F. and Jacquot, J.-P. (1987) The ferredoxin/thioredoxin system from the green alga, *Chlamydomonas reinhardtii*. In: Progress in Photosynthesis Research, Proc. VIIth International Congress on Photosynthesis, August 10-15, 1986, Providence, RI, USA (Biggins, J., ed.), Vol. III, pp. 443-446, Martinus Nijhoff, Boston
41. Wong, J.H., Yee, B.C. and Buchanan, B.B. (1987) A novel type of phosphofructokinase from plants. In: Progress in Photosynthesis Research, Proc. VIIth International Congress on

Photosynthesis, August 10-15, 1986, Providence, RI, USA (Biggins, J., ed.), Vol. III, pp. 487-490, Martinus Nijhoff, Boston

42. Cséke, C., Macdonald, F.D., Chou, Q. and Buchanan, B.B. (1987) Fructose 2,6-bisphosphate: a regulatory metabolite directing carbon flow between sucrose and starch. In: Progress in Photosynthesis Research, Proc. VIIth International Congress on Photosynthesis, August 10-15, 1986, Providence, RI, USA (Biggins, J., ed.), Vol. III, pp. 729-734, Martinus Nijhoff, Boston
43. Macdonald, F.D. and Buchanan, B.B. (1990) The role of fructose-2,6-bisphosphate in plant tissues. In: Fructose-2,6-bisphosphate: The Unique Sugar Diphosphate (Pilkis, S.J., ed.), pp. 194-209, CRC Press, Boca Raton, Florida
44. Buchanan, B.B. (1994) The ferredoxin/thioredoxin system: update on its role in the regulation of oxygenic photosynthesis. In: Advances in Molecular and Cell Biology (J. Barber, ed.), **10**, 337-354, JAI Press, Greenwich, CT
45. Buchanan, B.B. (1992) Role of light in the regulation of the dark reactions of photosynthesis. In: Trends in Photosynthesis Research. (Barber, J., Guerrero, M.G., Medrano, H., eds.), pp. 171-183, Intercept, Andover, UK
46. Buchanan, B.B., Lozano, R.M., Wong, J.H., Jiao, J. and Yee, B.C. (1994) Thioredoxin-linked reduction of wheat storage proteins. I. Physiological Consequences. In: Gluten Proteins 1993. pp. 369-380, Association of Cereal Research, Detmold, Germany.
47. Kobrehel, K., Nimbona, C., Buchanan, B.B., Bergmann, D., Wong, J.H. and Yee, B.C. (1994) Thioredoxin-linked reduction of wheat storage proteins. II. Technological Consequences. In: Gluten Proteins 1993. pp. 381-392, Association of Cereal Research, Detmold, Germany.
48. Gobin, P., Kobrehel, K., Bergmann, C.J., Ng, P.K.W. and Buchanan, B.B. (1994) Sulfhydryl status of wheat proteins during grain development. Gluten Proteins 1993. pp. 90-95, Association of Cereal Research, Detmold, Germany.
49. Melhorne, R.J., Buchanan, B.B. and Leighton, T. (1994) Bacterial chromate reduction and product characterization. In: Emerging Technology for Bioremediation of Metals. (J. L. Means and R. E. Hinchee, eds.), pp. 26-37, Lewis Publishers, Boca Raton, FL.
50. Buchanan, B.B., Schürmann, P. and Jacquot, J.-P. (1994) Thioredoxin and metabolic regulation. In: Seminars in Cell Biology. (A.R. Grossman, ed.), Vol. 5, Issue 5, pp. 285-293, Academic Press, London.
51. Buchanan, B.B. and Wolosiuk, R.A. (1998) Photosynthesis: carbon reactions. In: Plant Physiology, (Taiz, L. and Zeiger, E., eds.) 2nd. ed., Sinauer Associates, Inc., Sunderland, MA., pp. 195-225.
52. del Val, G., Besse, I., Adamidi, C., Wong, J.H., Yee, B.C. and Buchanan, B.B. (1999). Thioredoxin: A regulatory protein with potential application in medicine and technology. In:

Redox Regulation of Cell Signaling and Its Clinical Application (Packer, L. and Yodoi, J., eds.). pp. 225-234. Marcel Dekker, Inc., New York/Basel.

53. Marx, C., Lemaux, P.G. and Buchanan, B.B. (2000) The wheat grain: new research developments and approaches to improvement. In: Seed Technology and its Biological Basis (M. Black and J.D. Bewley, eds.), pp. 161-183.
54. Buchanan, B.B. and Wolosiuk, R.A. (2002) Photosynthesis: carbon reactions. In: Plant Physiology, (Taiz, L. and Zeiger, E., eds.) 3rd. ed., Sinauer Associates, Inc., Sunderland, MA, pp. 145-170.
55. Buchanan, B.B. and Frick, O.L. (2002) The dog as a model for food allergy. In: Genetically Engineered Food: Assessing Potential Allergenicity, Ann. N. Y. Acad. Sci., New York Academy of Sciences, New York, NY, **964**, 173-183.
56. Wong, J.H., Yano, H., Lee, Y.-M. and Buchanan, B.B. (2002) The identification of thioredoxin-linked proteins by fluorescent labeling combined with IEF/SDS PAGE. *Methods Enzymol.* **347**, 339-349.
57. Buchanan, B.B. (2003) Thioredoxin and redox regulation: Beginnings in photosynthesis lead to a role in germination and improvement of cereals. . In: Cellular Implications of Redox Signaling (C. Gitler and A. Danon, eds.), World Scientific, Hackensack, NJ, pp. 99-114.
58. Buchanan, B.B. and Wolosiuk, R.A. (2006) Photosynthesis: carbon reactions. In: Plant Physiology, (Taiz, L. and Zeiger, E., eds.) 4th ed., Sinauer Associates, Inc., Sunderland, MA, pp. 197-220.
59. Buchanan, B.B., Wong, J.H., Cho, M.-J., Kim, Y.-B., Jung, H.R., Kim, H.K., Sorigsaki, S., Lemaux, P.G., Moss, R.B., Teuber, S.S. and Frick, O.L. 2007 The dog as a model for assessing food allergens in wheat. . In: Gluten Proteins 2006. pp. 338-382. Edited by G. L. Lookhart and P.K.W. Ng. American Association of Cereal Chemists, St. Paul, MN. 448.
60. Hurkman, W.J., Vensel, W.H., DuPont, F.M. Altenbach, S.B. and Buchanan, B.B. (2008) Endosperm and Amyloplast Proteomes of Wheat Grain. In: Plant Proteomics, Technologies, Strategies and Applications (G. K. Agrawal and R. Rakwal, eds.), pp. 207-222, John Wiley and Sons, Hoboken, NJ
61. Balsera, M., Soll J. and Buchanan, B.B. (2009) Protein Import in Chloroplasts: An emerging role for redox. In: Oxidative Stress and Redox Regulation in Plants, *Adv. Bot. Res.* (J.-P. Jacquot, ed.) pp. 278-330, Elsevier (Academic Press), Maryland Heights, MO.
62. Wolosiuk, R.A. and Buchanan, B.B. (2010) Photosynthesis: carbon reactions. In: Plant Physiology, (Taiz, L. and Zeiger, E., eds.) 5th ed., Sinauer Associates, Inc., Sunderland, MA, pp. 199-24.
63. Wolosiuk, R.A. and Buchanan, B.B. (2015) Photosynthesis: carbon reactions. In: Plant Physiology and Development, (Taiz, L., Zeiger, E., Møller, I.M. and Murphy, A., eds.) 6th ed., Sinauer Associates, Inc., Sunderland, MA, pp. 203-244.