CURRICULUM VITAE

Name: Gregory A. Grant

Date and Place of Birth: October 18, 1949, Decorah, Iowa

Education:

1967-1971	B.S. Iowa State University, Ames Iowa
1971-1975	Ph.D., University of Wisconsin, Madison, Wisconsin

Appointments:

Nov. 1975-Aug. 1978	Research Associate Department of Biological Chemistry Washington University School of Medicine
Sept. 1978-June 1980	Research Asst. Prof. of Biochemistry in Medicine Department of Medicine, Division of Dermatology Washington University School of Medicine
July 1980-Aug. 1982	Research Assistant Professor of Biochemistry in Medicine and of Biological Chemistry Washington University School of Medicine
Sept. 1982-Dec. 1988	Assistant Professor of Biochemistry in Medicine and of Biological Chemistry Washington University School of Medicine
Sept. 1982-present	Director, Protein and Nucleic Acid Chemistry Laboratory Washington University School of Medicine
Jan. 1989-Dec. 1991	Associate Professor of Biochemistry in Medicine and of Biochemistry and Molecular Biophysics Washington University School of Medicine
Jan. 1992-June 1995	Associate Professor of Biochemistry in Medicine and of Molecular Biology and Pharmacology Washington University School of Medicine
July 1995 - Jan 2008	Professor of Biochemistry in Medicine and of Molecular Biology and Pharmacology Washington University School of Medicine

Feb 2008 - present	Professor of Biochemistry in Medicine and of Developmental Biology Washington University School of Medicine

Editorial and Advisory Committees; Honors:

Biochemistry Study Section, Division of Research Grants, National Institutes of Health, Member, 1992-1996, Ad hoc member, 1990, 1991, 1999, 2003.

Biochemistry Study Section, Division of Research Grants, National Institutes of Health, Fellowship Review Panel, 1997, 1998.

Macromolecular Structure and Function A Study Section, Division of Research Grants, National Institutes of Health, Ad hoc member 2006.

National Cancer Institute Site Visit Panel, 1991, 1998.

Grants Review Panel, Missouri Heart Association, member 1992.

Member, Federation of American Societies for Experimental Biology Committee on Federal Funding for Biomedical and Related Life Sciences Research, FY2001, FY 2002.

Association of Biomolecular Resource Facilities,
Committee on Protein Sequencing, 1988-1991, 1993, 1994
Co-Chairman 1989-1990, Chairman, 1990-1991.
Member of the Executive Board, 1992-1996,
President of the Association, 1993, 1994
ABRF Award Chairman, 1994 - 2007
Nominations Committee Chairman, 1997, 1998
Program Chair, ABRF 2002: Biomolecular Technologies, Tools for Discovery in Proteomics and Genomics (Annual Scientific Meeting), Austin, Texas

Associate Editor, Techniques in Protein Chemistry V, Academic Press, 1994
Associate Editor, Techniques in Protein Chemistry VI, Academic Press, 1995
Associate Editor, Techniques in Protein Chemistry VII, Academic Press, 1996

Abstract Review Committee, 7th Symposium of the Protein Society, 1993
Abstract Review Committee Chairman, 8th Symposium of the Protein Society, 1994

Associate Editor, Association of Biomolecular Resource Facilities Newsletter, 1992- 1996.

Editorial Board, *Letters in Peptide Science*, 1994 - 2003

Editorial Board, *Archives of Biochemistry and Biophysics*, 1997-present

Editorial Board, *Journal of Biomolecular Techniques*, 1999-present

Editorial Board, *Journal of Biological Chemistry*, 2001-2006, 2008-2013, 2014-2019.

Member, Finance Committee, Federation of American Societies for Experimental Biology (FASEB) 2008-2011.

Guest Editor for Special Volume: Allosteric Regulation. Archives of Biochemistry and Biophysics 519, 2012.

Who's Who in America, 2009
Who's Who in Science and Engineering 2011-2012 (11th Edition)

Plenary Lecture, 2013, 2nd Enzymes, Coenzymes, and Metabolic Pathways Conference, Zing Conferences.

Recipient of a Washington University "Bear Cub" award for entrepreneurship, 2016

Societies:

American Association for the Advancement of Science, 1977
American Chemical Society, 1978.
American Society for Biochemistry and Molecular Biology, 1982
The Protein Society, 1986
Association of Biomolecular Resource Facilities, 1988
American Peptide Society, 1990-2003
American Society for Mass Spectrometry, 1999-2006

Publications:

1. Shah, D.V., Suttie, J.W., and Grant, G.A. A Rat Liver Protein with Potential Thrombin Activity: Properties and Partial Purification. Arch. Biochem. Biophys. 159, 483-491 (1973).

2. Suttie, J.W., Shah, D.V., and Grant, G.A. Cellular Biochemistry of Prothrombin Synthesis. Thromb. Diath. Haemorrhag. Suppl. 273, 13-29 (1974).

3. Suttie, J.W., Esmon, C.T., Grant, G.A., and Shah, D.V. Postribosomal Function of Vitamin K in Prothrombin Synthesis. Mayo Clinic Proc. 49, 933-940 (1974).

4. Esmon, C.T., Grant, G.A., and Suttie, J.W. Purification of an Apparent Rat Liver Prothrombin Precursor: Characterization and Comparison to Normal Rat Prothrombin. Biochemistry 14, 1595-1600 (1975).

5. Grant, G.A., and Suttie, J.W. Rat Prothrombin: Purification, Characterization, and Activation. Arch. Biochem. Biophys. 176, 650-662 (1976).

6. Grant, G.A., and Suttie, J.W. Rat Liver Prothrombin Precursors: Purification of a Second, More Basic Form. Biochemistry 15, 5387-5393 (1976).

7. Grant, G.A., Keefer, L.M., and Bradshaw, R.A. D-3-Phosphoglycerate Dehydrogenase from Chicken Liver. I. Purification. J. Biol. Chem. 253, 2724-2726 (1978).

8. Grant, G.A., and Bradshaw, R.A. D-3-Phosphoglycerate Dehydrogenase from Chicken Liver. II. Chemical and Physical Properties. J. Biol. Chem. 253, 2727-2731 (1978).

9. Bielinska, M., Grant, G.A., and Boime, I. Processing of Placenta Hormones Synthesized in Lysates Containing Membranes Derived from Tunicamycin Treated Ascites Tumor Cells. J. Biol. Chem. 253, 7117-7119 (1978).

10. Hart, G.W., Brew, K., Grant, G.A., Bradshaw, R.A., and Lennarz, W.J. Primary Structural Requirements for the Enzymatic Formation of the N-Glycosidic Bond in Glycoproteins. J. Biol. Chem. 254, 9747-9753 (1979).

11. Chang, K., Uitto, J., Rowald, E.A., Grant, G.A., Kilo, C., and Williamson, J.R. Increased Collagen Cross-linkages in Experimental Diabetes. Reversal by β-Aminopropionitrile and D-Penicillamine. Diabetes 29, 778-781 (1980).

12. Grant, G.A., Henderson, K.O., Elsen, A.Z., and Bradshaw, R.A. Amino Acid Sequence of a Collagenolytic Protease from the Hepatopancreas of the Fiddler Crab. Uca pugilator. Biochemistry 19, 4653-4659 (1980).

13. Grant, G.A., and Eisen, A.Z. Substrate Specificity of the Collagenolytic Serine Protease from Uca pugilator: Studies with Non-Collagenous Substrates. Biochemistry 19, 6089-6095 (1980).

14. Bradshaw, R.A., Grant, G.A., Thomas, K.A., and Eisen, A.Z. Mouse NGF Gamma-Subunit and Crab Collagenase: Two Serine Proteases of Unusual

Function. In Protides of the Biological Fluids. H. Peeters, Ed., Oxford, Pergamon Press, Vol. 28, pp. 119-122, 1980.

15. Seltzer, J.L., Adams, S.A., Grant, G.A., and Eisen, A.Z. Purification and Properties of a Gelatin Specific Neutral Protease from Human Skin. J. Biol. Chem. 256, 4662-4668 (1981).

16. Maresca, B., Lambowitz, A.M., Kuman, V.B., Grant, G.A., Kobayashi, G.S., and Medoff, G. Role of Cysteine in Regulating Morphogenesis and Mitochondrial activity in the Dimorphic Fungus Histoplasma capsulatum. Proc. Natl. Acad. Sci. USA 78, 4596-4600 (1981).

17. Graves, C.B., Munns, T.W., Carlisle, T.L., Grant, G.A., and Strauss, A.W. Induction of Prothrombin Synthesis by Prothrombin Fragments. Proc. Natl. Acad. Sci. USA 78, 4772-4776 (1981).

18. Grant, G.A., and Zapp, M.L. D-3-Phosphoglycerate Dehydrogenase from E. coli: Isolation by Affinity Chromatography and Sequence Comparison to Other Dehydrogenases. Bioscience Reports 1, 733-741 (1981).

19. Grant, G.A., Eisen, A.Z., and Bradshaw, R.A. Collagenolytic Protease from Fiddler Crab, Uca pugilator. Meth. Enzymol. 80, 722-734 (1982).

20. Welgus, H.G., Grant, G.A., Jeffrey, J.J., and Eisen, A.Z. Substrate Specificity of the Collagenolytic Serine Protease from Uca pugilator: Studies with Collagenous Substrates. Biochemistry 21, 5183-5189 (1982).

21. Uitto, J., Perejda, A.J., Grant, G.A., Rowald, E.A., Kilo, C., and Williamson, J.R. Glycosylation of Human Glomerular Basement Membrane Collagen: Increased Content of Hexose in Ketoamine Linkage and Unaltered Hydroxylysine-o-glycosides in Patients with Diabetes. Conn. Tiss. Rev. 10, 287-296 (1982).

22. Grant, G.A., Sacchettini, J.C., and Welgus, H.G. A Collagenolytic Serine Protease with Trypsin-like Specificity from the Fiddler Crab, Uca pugilator. Biochemistry 22, 354-358 (1983).

23. Cassel, D., Pike, L.J., Grant, G.A., Krebs, E.G., and Glaser, L. Interaction of Epidermal Growth Factor-Dependent Protein Kinase with Endogenous Membrane Proteins and Soluble Peptide Substrate. J. Biol. Chem. 258, 2945-2950 (1983).

24. Welgus, H.G., and Grant, G.A. Degradation of Collagen Substrates by a Trypsin-like Serine Protease from the Fiddler Crab Uca pugilator. Biochemistry 22, 2228-2233 (1983).

25. Dixit, V.M., Grant, G.A., Frazier, W.A., and Santoro, S.A. Isolation of the Fibrinogen Binding Region of Platelet Thrombospondin. Biochem. Biophys. Res. Comm. 119, 1075-1081 (1984).

26. Dixit, V.M., Grant, G.A., Santoro, S.A., and Frazier, W.A. Isolation and Characterization of a Heparin-Binding Domain from the Amino Terminus of Platelet Thrombospondin. J. Biol. Chem. 259, 10100-10105 (1984).

27. Haverstick, D.M., Dixit, V.M., Grant, G.A., Frazier, W.A., and Santoro, S.A. Localization of the Hemagglutinating Activity of Platelet Thrombospondin to a 140,000-Dalton Thermolytic Fragment. Biochemistry 23, 5597-5603 (1984).

28. Haverstick, D.M., Dixit, V.M., Grant, G.A., Frazier, W.A., and Santoro, S.A. Characterization of the Platelet Agglutinating Activity of Thrombospondin. Biochemistry 24, 3128-3134 (1985).

29. Dixit, V.M., Haverstick, D.M., O'Rourke, K.M., McDonald, J.A., Grant, G.A., Santoro, S.A., and Frazier, W.A. Inhibition of Platelet Aggregation by a Monoclonal Antibody against Human Fibronectin. Proc. Natl. Acad. Sci. USA 82, 3844-3848 (1985).

30. Grant, G.A., and Chiappinelli, V.A. Kappa-Bungarotoxin: Complete Amino Acid Sequence of a Neuronal Nicotinic Receptor Probe. Biochemistry 24, 1532-1537 (1985).

31. Dixit, V.M., Haverstick, D.M., O'Rourke, K.M., Hennessy, S.W., Grant, G.A., Santoro, S.A., and Frazier, W.A. A Monoclonal Antibody against Human Thrombospondin Inhibits Platelet Aggregation. Proc. Natl. Acad. Sci. USA 82, 3472-3476 (1985).

32. Dixit, V.M., Haverstick, D.M., O'Rourke, K.M., Hennessy, S.W., Grant, G.A., Santoro, S.A., and Frazier, W.A. Effects of Anti-Thrombospondin Monoclonal Antibodies on Agglutination of Erythrocytes and Fixed Activated Platelets by Purified Thrombospondin. Biochemistry 24, 4270-4275 (1985).

33. Galvin, N.J., Dixit, V.M., O'Rourke, K.M., Santoro, S.A., Grant, G.A., and Frazier, W.A. Mapping of Epitopes for Monoclonal Antibodies against Human Platelet Thrombospondin with Electron Microscopy and High Sensitivity Amino Acid Sequencing. J. Cell Biol. 101, 1434-1441 (1985).

34. Welgus, H.G., Grant, G.A., Sacchettini, J.C., Roswit, W.J., and Jeffrey, J.J. The Gelationlytic Activity of Rat Uterus Collagenase. J. Biol. Chem. 260, 13601-13606 (1985).

35. Goldberg, G.I., Wilhelm, S.M., Kronberger, A., Bauer, E.A., Grant, G.A., and Eisen, A.Z. Human Fibroblast Collagenase: Complete Primary Structure and

Homology to an Oncogene Transformation-Induced Rat Protein. J. Biol. Chem. 261, 6600-6605 (1986).

36. Dixit, V.M., Hennessy, S.V., Grant, G.A., Rotwein, P., and Frazier, W.A. Characterization of a cDNA Encoding for the Heparin and Collagen Binding Domains of Human Thrombospondin. Proc. Natl. Acad. Sci. USA 83, 5449-5453 (1986).

37. Tobey, K.L., and Grant, G.A. The Nucleotide Sequence of the serA Gene of Escherichia coli and the Amino Acid Sequence of the Encoded Protein, D-3-Phosphoglycerate Dehydrogenase. J. Biol. Chem. 261, 12179-12183 (1986).

38. Fernandez-Pol, J.A., Klos, D.J., and Grant, G.A. Purification and Biological Properties of Type Beta Transforming Growth Factor from Mouse Transformed Cells. Cancer Res. 46, 5153-5161 (1986).

39. Grant, P.M., Roderick, S.L., Grant, G.A., Banaszak, L.J., and Strauss, A.W. A Comparison of the Precursor and Mature Forms of Rat Heart Mitochondrial Malate Dehydrogenase. Biochemistry 26, 128-134 (1987).

40. Grant, G.A., Eisen, A.Z., Marmer, B.L., Roswit, W.T., and Goldberg, G.I. The Activation of Human Skin Fibroblast Procollagenase: Sequence Identification of the Major Conversion Products. J. Biol. Chem. 262, 5886-5889 (1987).

41. Matschiner, J.T., Willingham, A.K., Nendrick, M.L., and Grant, G.A. Heterogeneity of Protein C and Factor X from Human Plasma. in Current Advances in Vitamin K Research: Proc. of the 17th Steenbock Symposium, Univ. of Wisconsin-Madison, (Suttie, J.W., ed.), pp. 135-140, Elsevier, (1988).

42. Wilhelm, S.M., Collier, I.E., Kronberger, A., Eisen, A.Z., Marmer, B.L., Grant, G.A., Bauer, E.A., and Goldberg, G.I. Human Skin Fibroblast Stromolysin: Structure, Glycosylation, Substrate Specificity, and Differential Expression in Normal and Tumorigenic Cells. Proc. Natl. Acad. Sci. USA 84, 6725-6729 (1988).

43. Grant, G.A., Frazier, M.W., and Chiappinelli, V.A. The Amino Acid Sequence of κ-Flavitoxin: Establishment of a New Family of Snake Venom Neurotoxins. Biochemistry 27, 3794-3798 (1988).

44. Collier, I.E., Wihelm, S.M., Eisen, A.Z., Marmer, B.L., Grant, G.A., Seltzer, J.L., Kronberger, A., He, C., Bauer, E.A., and Goldberg, G.I. Human Bronchial Epithelial Cells Repond to Transformation with H-ras Oncogene by Secretion of a Single Metalloprotease Capable of Degrading Basement Membrane Collagen. J. Biol. Chem. 263, 6579-6587 (1988).

45. Sacchettini, J.C., Frazier, M.W., Chiara, D.C., Banaszak, L.J., and Grant, G.A. Amino Acid Sequence of Porcine Heart Fumarase. Biochem. Biophys. Res. Commun. 153, 435-440 (1988).

46. Chiappinelli, V.A., Dryer, S.E., Sorenson, E.M., Wolf, K.M., Grant, G.A., Chen, S.-S., Nooney, J.M., Lambert, J.J., and Hider, R.C. Functional Studies of Neuronal Nicotinic Receptors Utilizing Kappa-Neurotoxins. In Nicotinic Acetylcholine Receptors in the Nervous System (Clementi, F., ed.), pp. 15-29, Springer, Berlin (1988).

47. Grant, G.A., Dixit, V.M., Galvin, N.J., O'Rourke, K.M., Santoro, S.A., and Frazier, W.A. Mapping Functional Domains of Human Platelet Thrombospondin with Electroblotting and High Sensitivity Sequencing. In Proteins: Structure and Function (L'Italien, J.J., ed.) pp. 471-477, Plenum, New York (1988).

48. Schuller, D.J., Fetter, C.H., Banaszak, L.J., and Grant, G.A. Enhanced Expression of the Escherichia coli SerA Gene in a Plasmid Vector: Purification, Crystallization, and Preliminary X-ray Data of D-3-Phosphoglycerate Dehydrogenase. J. Biol. Chem. 264, 2645-2648 (1989).

49. He, C., Wilhelm, S.M., Pentland, A.P., Marmer, B.L., Grant, G.A., Eisen, A.Z., and Goldberg, G.I. Tissue Cooperation in a Proteolytic Cascade Activating Human Interstitial Collagenase. Proc. Natl. Acad. Sci. USA 86, 2632-2636 (1989).

50. Wilhelm, S.M., Collier, I.E., Marmer, B.L., Eisen, A.Z., Grant, G.A., and Goldberg, G.I. SV40 Transformed Human Lung Fibroblasts Secrete a 92 kDa Type IV Collagenase which is Identical to that Secreted by Normal Human Macrophages. J. Biol. Chem. 264, 17213-17221 (1989).

51. Goldberg, G.I., Marmer, B.L., Grant, G.A., Eisen, A.Z., Wilhelm, S., and He, C. Human 72 kDa Type IV Collagenase Forms a Complex with a Novel Tissue Inhibitor of Metalloproteases, TIMP-2. Proc. Natl. Acad. Sci. USA 86, 8207-8211 (1989).

52. Seltzer, J.L., Weingarten, H., Akers, K.T., Eschbach, M.L., Grant, G.A., and Eisen, A.Z. Cleavage Specificity of Type IV Collagenase (Gelatinase) from Human Skin. J. Biol. Chem. 264, 19583-19586 (1989).

53. Grant, G.A. A New Family of 2-Hydroxyacid Dehydrogenases. Biochem. Biophys. Res. Comm. 165, 1371-1374 (1989).

54. Chiapinelli, V.A., Wolf, K.M., Grant, G.A., and Chen, S.-J. $Kappa_2$ -Bungarotoxin and $Kappa_3$-Bungarotoxin: Two New Neuronal Nicotinic Receptor Antagonists Isolated From the Venom of Bungarus Multicinctus. Brain Res. 509, 237-248 (1990).

55. Speicher, D.W., Grant, G.A., Niece, R.L., Blacher, R.W., Fowler, A.V., and Williams, K.R. Design, Characterization and Results of ABRF-89SEQ: A Test Sample for Evaluating Protein Sequence Performance in Protein Microchemisty Core Facilities. in Current Research in Protein Chemistry (Villafranca, J., ed.), pp. 159-166, Academic Press, (1990).

56. Seltzer, J.L., Akers, K.T., Weingarten, H., Grant, G.A., McCourt, D.W., and Eisen, A.Z. Cleavage Specificity of Human Skin Type IV Collagenase (Gelatinase): Identification of Cleavage Sites in Type I Gelatin, with Confirmation Using Synthetic Peptides. J. Biol. Chem., 265, 20409-20413 (1990).

57. Yuksel, K.U., Grant, G.A., Mende-Mueller, L.M., Niece, R.L., Williams, K.R., and Speicher, D.W. Protein Sequencing from Polvinylidenedifluoride Membranes: Design and Characterization of a Test Sample (ABRF-90SEQ) and Evaluation of Results. In Techniques in Protein Chemistry II (Villafranca, J., ed.) pp. 151-162, Academic Press (1991).

58. Grant, G.A., Goldberg, G.I., Wilhelm, S.M., He, C., and Eisen, A.Z. Activation of Extracellular Matrix Metalloproteases by Proteases and Organomercurials. Matrix, Suppl. 1, 217-223 (1992).

59. Goldberg, G.I., Collier, I.E., Eisen, A.Z., Grant, G.A., Marmer, B.L., and Wilhelm, S., Mosaic Structure of the Secreted ECM Metalloproteases and Interactions of Type IV Collagenases with Inhibitors. Matrix, Suppl. 1, 25-30 (1992).

60. Crimmins, D.L., Grant, G.A., Mende-Mueller, L.M., Niece, R.L., Slaughter, C., Speicher, D.W., and Yüksel, K.ü, Evaluation of Protein Sequencing Core Facilities: Design, Characterization, and Results from a Test Sample (ABRF-91SEQ). In Techniques in Protein Chemistry III (Angeletti, R.H., ed.) pp. 15-43 Academic Press (1992).

61. Fiordalisi, J.J., Fetter, C.H., Ten Harmsel, A., Gigowski, R., Chiappinelli, V.A., and Grant, G.A., Synthesis and Expression in E. coli of a Gene for κ-Bungarotoxin. Biochemistry, 30, 10337-10343 (1992).

62. Jiang, W., Gorbea, C.M., Flannery, A.V., Beynon, R.S., Grant, G.A., and Bond, J.S. The α Subunit of Meprin A: Molecular Cloning and Sequencing, Differential Expression in Inbred Mouse Strains and Evidence for Divergent Evolution of the ✔ and ✍ Subunits. J. Biol. Chem. 267, 9185-9193 (1992).

63. Sacchettini, J.C., Patel, S., Scapin, G., Fiordalisi, J.J. and Grant, G.A. Crystallization of ✍-Bungarotoxin: Preliminary X-ray Data Obtained from the Venom Derived Protein. J. Mol. Biol. 226, 559-562 (1992).

64. Fiordalisi, J.S., Gigowski, R.L., and Grant, G.A. Purification of an Active Species of Recombinant ✍-Bungarotoxin. Protein Expression and Purification, 3, 282-289 (1992).

65. Fiordalisi, J.J., and Grant, G.A. Evidence for a Fast-Exchange Conformational Process in ✔-Bungarotoxin, Toxicon., 31, 767-775 (1993).

66. Strongin A. Y., Marmer, B. I., Grant, G. A., and Goldberg, G. I. Plasma Membrane Dependent Activation of the 72 kDa Type IV Collagenase is Prevented by Complex Formation with TIMP-2. J. Biol. Chem., 268, 14033-14039 (1993).

67. Fiordalisi, J.J., and Grant, G.A. Analytical Ultracentrifugation Analysis of the Self-Association of ✍-Bungarotoxin. In Techniques in Protein Chemistry V (Crabb, J. W., ed.) Academic Press (1994) pp. 269-274.

68. Rush, J., Andrews, P. C., Crimmins, D. L., Gambee, J., Grant, G. A., Mische, S. M., and Speicher, D. W. A Synthetic Peptide for Evaluating Protein Sequencing Capabilities: Design of ABRF-93SEQ and Results. In Techniques in Protein Chemistry V (Crabb, J. W., ed.) Academic Press (1994) pp. 133-141.

69. Fiordalisi, J. J., Al-Rabiee, R., Chiappinelli, V. A., and Grant, G. A. Site-Specific Mutagenesis of ✍-Bungarotoxin: Implications for Neuronal Receptor Specificity. Biochemistry, 33, 3872-3877 (1994) .

70. Gambee, J., Andrews, P. C., DeJongh, K., Grant, G., Merrill, B., Mische, S., and Rush, J. Assignment of Cysteine and Tryptophan Residues During Protein Sequencing: Results of ABRF-94SEQ. In Techniques in Protein Chemistry VI (Crabb, J. W., ed.) Academic Press (1995), pp. 209-217.

71. Fiordalisi, J. J., Al-Rabiee, R., Chiappinelli, V. A., and Grant, G. A. Affinity of Native ✍-Bungarotoxin and Site-Directed Mutants for the Muscle Nicotinic Acetylcholine Receptor. Biochemistry 33, 12962-12967 (1994).

72. Dewan, J., Grant, G. A., and Sacchettini, J. C. The Crystal Structure of ✍-Bungarotoxin to 2.3 Å Resolution. Biochemistry 33, 13147-13154 (1994).

73. Fiordalisi, J. J., and Grant, G. A. Evidence for the Presence of ✔-Bungarotoxin in Venom-Derived ✍-Bungarotoxin. In Techniques in Protein Chemistry VI (Crabb, J. W., ed.) Academic Press (1995), pp. 293-299.

74. Schuller, D., Grant, G. A., and Banaszak, L. Crystal Structure Reveals the Allosteric Ligand Site in the Vmax -type Cooperative Emzyme: D-3-Phosphoglycerate Dehydrogenase. Nature Structural Biology 2, 69-76 (1995).

75. Strongin, A. Y., Collier, I., Bannikov, G., Marmer, B. I., Grant, G. A., and Goldberg, G. I. Mechanism of Cell Surface Activation of 72 kDa Type IV Collagenase: Isolation of the Activated Form of the Membrane Metalloprotease. J. Biol Chem. 270, 5331-5338 (1995).

76. Fiordalisi, J. J., James, P. L., Zhang, Y., and Grant, G. A. Facile Production of Native-like α-Bungarotoxin in Yeast: An Enhanced System for the Production of a Neuronal Acetylcholine Receptor Probe. Toxicon 34, 213-224 (1996).

77. Chiappinelli, V. A., Weaver, W. R., McLane, K. E., Conti-Fine, B. M., Fiordalisi, J. J., and Grant, G. A. (1996) The Binding Site for α-Neurotoxins on Neuronal Nicotinic Receptors Probed with Snake-Venom Derived and Recombinant Toxins. Toxicon 34, 1243-1256.

78. Grant, G. A., Schuller, D. J., and Banaszak, L. J. A Model for the Regulation of D-3-Phosphoglycerate Dehydrogenase, a Vmax-Type Allosteric Enzyme. Protein Science 5, 34-41 (1996).

79. De Jongh, K., Fernandez, J., Gambee, J. E., Grant, G. A., Stone, K. L., Merrill, B., and Rush, J. Design and Analysis of ABRF-95SEQ, a Recombinant Protein with Sequence Heterogeneity. In Techniques in Protein Chemistry VII (Marshak, D. R., ed.) Academic Press (1997), pp. 347-358.

80. Al-Rabiee, R., Lee, E. J., and Grant, G. A. The Mechanism of Velocity Modulated Regulation in D-3-Phosphoglycerate Dehydrogenase: Cross-linking Adjacent Regulatory Domains with Engineered Disulfides Mimics Effector Binding. J. Biol. Chem., 271, 13013-13017 (1996).

81. Fernandez, J., Admon, A., De Jongh, K., Grant, G., Henzel W., Lane, W. S., Stone, K. L., and Merrill, B. Evaluation of ABRF-96SEQ: A Sequence Assignment Exercise. In Techniques in Protein Chemistry VIII (Marshak, D. R., ed.) Academic Press (1997).

82. Al-Rabiee, R., Zhang, Y., and Grant, G. A. The Mechanism of Velocity Modulated Regulation in D-3-Phosphoglycerate Dehydrogenase: Site Directed Mutagenesis of Effector Binding Site Residues. J. Biol. Chem. 271, 23235-23238 (1996).

83. Gorman, S. Viseshakul, N., Cohen, B., Hardy, S., Grant, G. A., Yost, C. S., and Forsayeth J. R. (1997) A Recombinant Adenovirus that Directs Secretion of Biologically Active α-Bungarotoxin from Mammalian Cells. Molecular Brain Research 44, 143-146.

84. Grant, G. A., Al-Rabiee, R., Xu, X. L., and Zhang, Y. (1997) Critical Interactions at the Dimer Interface of α-Bungarotoxin. Biochemistry 36, 3353-3358.

85. Rozwarski, D. A., Grant, G. A., Barton, D. H. R., Jacobs, W. R. Jr., and Sacchettini, J. C. (1998) Modification of the NADH of the Isoniazid Target (InhA) from Mycobacterium tuberculosis. Science, 279, 98-102.

86. Grant, G. A., and Xu, X. L. (1998) Probing the Regulatory Domain Interface of D-3-Phosphoglycerate Dehydrogenase with Engineered Tryptophan Residues. J. Biol. Chem. 273, 22389-22394.

87. Grant, G. A., Luetje, C. W., Summers, R., and Xu, X. L. (1998) Differential Roles for Disulfide Bonds in the Structural Integrity and Biological Activity of α-Bungarotoxin, a Neuronal Nicotinic Acetylcholine Receptor Antagonist, Biochemistry 37, 12166-12171.

88. Grant, G. A., Kim, S. J., Xu, X. L., and Hu, Z. (1999) The Contribution of Adjacent Subunits to the Active Sites of D-3-Phosphoglycerate Dehydrogenase. J. Biol. Chem. 274, 5357-5361.

89. Grant, G. A., Xu, X. L., and Hu, Z. (1999) The Relationship Between Effector Binding and Inhibition of Activity in D-3-Phosphoglycerate Dehydrogenase. Protein Science 8, 2501-2505.

90. Grant, G. A., Xu, X. L., Hu, Z., and Purvis A. R. (1999) Phosphate Ion Partially Relieves the Cooperativity of Effector Binding in D-3-Phosphoglycerate Dehydrogenase without Altering The Cooperativity of Inhibition. Biochemistry 38, 16548-16552.

91. Grant, G. A., Xu, X. L., and Hu, Z. (2000) Removal of the Tryptophan 139 Side Chain in E. coli D-3-Phosphoglycerate Dehydrogenase Produces a Dimeric Enzyme Without Cooperative Effects. Arch. Biochem. Biophys 375, 171-174.

92. Grant, G. A., Xu, X. L., and Hu, Z. (2000) The Role of an Interdomain Gly-Gly Sequence at the Regulatory-Substrate Domain Interface in the Regulation of E. coli. D-3-Phosphoglycerate Dehydrogenase. Biochemistry 39, 7316-7319.

93. Grant, G. A., Hu, Z. and Xu, X. L. (2001) Specific Interactions at the Regulatory Domain-Substrate Binding Domain Interface Influence the Cooperativity of Inhibition and Effector Binding in *E. coli*. D-3-Phosphoglycerate Dehydrogenase. J. Biol. Chem. 276, 1078-1083.

94. Grant, G. A., Hu, Z. and Xu, X. L. (2001) Amino Acid Residue Mutations Uncouple Cooperative Effects in *E. coli*. D-3-Phosphoglycerate Dehydrogenase. J. Biol. Chem. 276, 17844-17850.

95. Bell, J. K., Pease, P. J., Bell, J. E., Grant, G. A., and Banaszak, L. J. (2002) Deregulation of D-3- Phosphoglycerate Dehydrogenase by Domain Removal. Eur. J. Biochem. 269, 4176-4184.

96. Grant, G. A., Hu, Z. and Xu, X. L. (2002) Cofactor Binding to *E. coli* D-3 Phosphoglycerate Dehydrogenase Induces Multiple Conformations Which Alter Effector Binding. J. Biol. Chem. 277, 39548-39553.

97. Grant, G. A., Hu, Z. and Xu, X. L. (2003) Hybrid Tetramers Reveal Elements of Cooperativity in *E. coli* D-3- Phosphoglycerate Dehydrogenase. J. Biol. Chem. 278, 18170-18176.

98. Ramanadham, S., Song, H., Hsu, F-F., Zhang, S., Crankshaw, M., Grant, G. A., Newgard, C. B., Bao, S., Ma, Z., and Turk, J. (2003) Pancreatic Islets and Insulinoma Cells Express a Novel Isoform of Group VIa Phospholipase A_2 ($iPLA_2\beta$) that participates in Glucose-Stimulated Insulin Secretion and is not Produced by Alternate Splicing of the $iPLA_2\beta$ Transcript. Biochemistry, 42, 13929-13940.

99. Grant, G. A., Xu, X. L., and Hu, Z. (2004) Quantitative relationships of site to site interaction in E. coli D-3-phosphoglycerate dehydrogenase revealed by asymmetric hybrid tetramers. J. Biol. Chem. 279, 13452-13460.

100. Bell, J. K., Grant, G. A., and Banaszak, L. J. (2004) Multi-conformational States in Phosphoglycerate Dehydrogenase. Biochemistry 43, 3450-3458.

101. Dey, S., Hu, Z., Xu, X. L., Sacchettini, J. C., and Grant, G. A. (2005) D-3-Phosphoglycerate Dehydrogenase from *Mycobacterium Tuberculosis* is a Link Between the *E. coli* and Mammalian Enzymes. J. Biol. Chem. 280, 14884-14891.

102. Dey, S., Grant, G. A., and Sacchettini, J. C. (2005) Crystal Structure of *Mycobacterium tuberculosis* D-3-Phosphoglycerate Dehydrogenase: Extreme Asymmetry in a Tetramer of Identical Subunits. J. Biol. Chem, 280, 14892-14899.

103. Thompson, J. R., Bell, J. K., Bratt, J., Grant, G. A., and Banaszak, L. J. (2005) Vmax Regulation Through Domain and Subunit Changes. The Active Form of Phosphoglycerate Dehydrogenase. Biochemistry 44, 5763-5773.

104. Grant, G. A., Hu, Z., and Xu, X. L. (2005) Identification of Amino Acid Residues Contributing to the Mechanism of Cooperativity in *Escherichia coli* D-3-Phosphoglycerate Dehydrogenase. Biochemistry 44, 16844-16852.

105. Dey, S., Hu, Z., Xu, X. L., Sacchettini, J. C., and Grant, G. A. (2007) The Effect of Hinge Mutations on Effector Binding and Domain Rotation in *E. coli* D-3-Phosphoglycerate Dehydrogenase. J. Biol. Chem. 282, 18418-18426.

106. Burton, R. L., Chen, S., Xu, X. L., and Grant G. A. (2007) A Novel Mechanism for Substrate Inhibition in *Mycobacterium tuberculosis* D-3-Phosphoglycerate Dehydrogenase. J. Biol. Chem. 282, 31517-31524.

107. Dey, S., Burton, R. L., Grant, G. A., and Sacchettini, J. C. (2008) Structural analysis of substrate and effector binding in *Mycobacterium tuberculosis* D-3-Phosphoglycerate Dehydrogenase, Biochemistry 47, 8721-8282.

108. Burton, R. L., Hanes, J. W., and Grant, G. A. (2008) A stopped-flow kinetic analysis of substrate binding and catalysis in *E. coli* D-3-Phoshphoglycerate Dehydrogense, J. Biol. Chem. 283, 29706-29714.

109. Burton, R. L., Chen, S., Xu, X. L., and Grant G. A. (2009) Role of the Anion-Binding Site in Catalysis and Regulation of *Mycobacterium tuberculosis* D-3-Phosphoglycerate Dehydrogenase, Biochemistry 48, 4808-4815.

110. Burton, R. L., Chen, S., Xu, X. L., and Grant G. A. (2009) Transient Kinetic Analysis of L-Serine Interaction with *E. coli* D-3-Phosphoglycerate Dehydrogenase Reveals the Mechanism of V-type Regulation and the Order of Effector Binding, Biochemistry 48, 12242-12251.

111. Grant, G. A. (2011) Transient Kinetic Analysis of L-Serine Interaction with *E. coli* D-3-Phosphoglycerate Dehydrogenase Containing Amino Acid Mutations in the Hinge Region, Biochemistry 50, 2900-2906.

112. Xu, X. L., Chen, S., and Grant, G. A. (2011) Kinetic, Mutagenic, and Structural Homology Analysis of L-Serine Dehydratase from Legionella pneumophila. Archives of Biochemistry and Biophysics, 515/1-2, 28-36.

113 Chen, S., Xu, X. L., and Grant, G.A. (2012) Allosteric Activation and Contrasting Properties of Types 1 and 2 L-Serine Dehydratases, Biochemistry, 51, 5320-5328.

114. Grant, G. A. (2012) Kinetic Evidence for a Noncatalytic Substrate Binding Site that Regulates Activity in Legionella pneumophila L-Serine Dehydratase. Biochemistry, 51, 6961-6967.

115. Xu., X. L. and Grant, G. A. (2013) Identification and Characterization of Two New Types of Bacterial L-Serine Dehydratases and Assessment of the Function of the ACT Domain. Arch. Biochem. Biophys. 540/1-2, 62-69.

116. Xu, X. L. and Grant, G. A. (2014) Regulation of *Mycobacterium Tuberculosis* D-3-Phosphoglycerate Dehydrogenase by Phosphate Modulated Quaternary Structure Dynamics and a Potential Role for Polyphosphate in Enzyme Regulation. Biochemistry 53, 4239-4249.

117. Thoden, J. B., Holden, H. M.., and Grant, G. A., (2014) Structure of L-Serine Dehydratase from *Legionella pneumophila*: Novel Use of the C-terminal Cysteine as an Intrinsic Competitive Inhibitor, Biochemistry 53, 7615-7624.

118. Xu, X. L., Chen, S., Salinas, N., Tolia, N., and Grant, G. A. (2015) Comparison of Type 1 D-3-Phosphoglycerate Dehydrogenases Reveals Unique Regulation in Pathogenic Mycobacteria. Arch. Biochem. Biophys. 570, 32-39.

119. Yan, Y., Grant, G. A., and Gross, M. L. (2015) Hydrogen Deuterium Exchange Mass Spectrometry Reveals Unique Conformational and Chemical Transformations Occurring upon [4Fe-4S] Cluster Binding in the Type 2 L-Serine Dehydratase from *Legionella pneumophila*. Biochemistry 54, 5322-5328.

120. Xu, X. L., and Grant, G. A. (2016) Mutagenic and chemical analyses provide new insight into enzyme activation and mechanism of the type 2 iron-sulfur L-serine dehydratase from *Legionella pneumophila*. Arch. Biochem. Biophys. 596, 108-117.

Invited Articles

1. Grant, G.A., Evaluation of Synthetic Peptides. In Synthetic Peptides: A User's Guide (Grant, G.A., ed.) W.H. Freeman, New York, pp. 185-258 (1992).

2. Crankshaw, M. W., and Gregory A. Grant. Identification of Modified Amino Acids in Protein Sequence Analysis, Association of Biomolecular Resource Facilities, Bethesda, Maryland (1993).

3. Grant, G.A., Peptides, Synthetic. In Molecular Biology and Biotechnology: A Comprehensive Desk Reference (Meyers, R.A., ed.) pp. 654-658 VCH, Weinheim, (1995).

4. Grant, G.A., Peptides, Synthetic. In Encyclopedia of Molecular Biology: Fundamentals and Applications (Meyers, R.A., ed.) pp. 361-371 VCH, Weinheim, (1996).

5. Crankshaw, M. W. and Grant, G. A. Modification of Cysteine In Current Protocols in Protein Science, John Wiley and Sons, New York, pp. 15.1.1 - 15.1.18., (1996).

6. Grant, G. A., and Crankshaw, M. W. Identification of PTH-Amino Acids by High-Performance Liquid Chromatography, in Protein Sequencing Protocols, (B. J. Smith, Ed.) Humana Press, pp. 197- 215, (1996).

7. Grant, G. A., Crankshaw, M. W., and Gorka, J. Edman Sequencing as a Tool for the Characterization of Synthetic Peptides. Meth. Enzymol. 289, 395-419 (1997).

8. Grant, G. A. Synthetic Peptides for the Production of Antibodies that Recognize Intact Proteins In Current Protocols in Protein Science, John Wiley and Sons, New York, pp. 18.3.1 - 18.3.17, (1998)

9. Grant, G. A. Structure, Function, and Biophysical Aspects of κ-Neurotoxins, In Journal of Toxicology-Toxin Reviews 17, 239-260 (1998).

10. Grant, G. A., and Crankshaw, M. W. Identification of PTH-Amino Acids by High-Performance Liquid Chromatography, in Protein Sequencing Protocols, 2nd edition (B. J. Smith, Ed.) Humana Press, pp. 247-268 (2002).

11. Grant, G. A. Synthetic Peptides for the Production of Antibodies that Recognize Intact Proteins In Current Protocols in Protein Science, John Wiley and Sons, New York, pp. 18.3.1 - 18.3.17, (revised 2002).

12. Grant, G. A. Synthetic Peptides for the Production of Antibodies that Recognize Intact Proteins In Current Protocols in Immunology, John Wiley and Sons, New York, pp. 9.2.1 - 9.2.18, (2002).

13. Grant GA. Synthetic peptides for production of antibodies that recognize intact proteins. Curr Protoc Mol Biol. 2002 Aug;Chapter 11:Unit 11.16.

14. Grant, G.A., Evaluation of the Synthetic Product. In Synthetic Peptides: A User's Guide, 2nd Edition (Grant, G.A., ed.) Oxford University Press, New York, pp. 220-291 (2002).

15. Moore, M.L., and Grant, G.A., Peptide Design Considerations. In Synthetic Peptides: A User's Guide, 2nd Edition (Grant, G.A., ed.) Oxford University Press, New York, pp. 10-92 (2002).

16. Grant, G. A. Methods for Analyzing Cooperativity in Phosphoglycerate Dehydrogenase. Meth. Enzymol. 380, 106-131, (2004).

17. Grant, G.A., Peptides, Synthetic. In Encyclopedia of Molecular Cell Biology and Molecular Medicine (Meyers, R.A., ed.) Vol. 3, 2nd Edition, pp. 239-260, VCH, Weinheim (2004).

18. Grant, G. A., Crankshaw, M. W., and Crankshaw, C. L. Enzyme Digestion Strategies for Sequence Analysis. Encyclopedia of Mass Spectrometry, Vol 2, Biological Applications Part A: Peptides and Proteins. (R. Caprioli and M. Gross, eds.) Elsevier (2005), pp. 151-157.

19. Grant, G. A. The ACT Domain: A Small Molecule Binding Domain and its Role as a Common Regulatory Element, (2006) J. Biol. Chem. 281, 33825-33829.

20. Grant, G.A., Design and Application of Synthetic Peptides In Proteins (Meyers, R.A., ed.) Vol. 1, pp. 431-452, VCH, Weinheim (2007).

21. Grant G. A., Contrasting Catalytic and Allosteric Mechanisms for Phosphoglycerate Dehydrogenases, (2012) Arch. Biochem. Biophys. 519, 175-185.

22. Grant GA. Allosteric regulation: guest editor's introduction. Arch Biochem Biophys. 2012 Mar 15;519(2):67-8.

23. Grant G.A., Isolation/Purification of Proteins. In: Ralph A Bradshaw and Philip D Stahl (Editors-in-Chief), Encyclopedia of Cell Biology, Vol 1, Waltham, MA: Academic Press, 2015, pp. 66-74.

24. Holden, H. M., Thoden, J. B., and Grant, G. A. (2016) Fe-S Based L-Serine Dehydratases. Encyclopedia of Bioorganic and Inorganic Chemistry, Online John Wiley and Sons Ltd., DOI: 10.1002/9781119951438.eibc2445.

25. Grant, G. A. (2017) Modification of Cysteine In Current Protocols in Protein Science, John Wiley and Sons, New York, Curr. Protoc. Protein Sci. 87:15.1.1-15.1.23. doi: 10.1002/cpps.22.

Books and Volumes

Synthetic Peptides: A User's Guide (Grant, G.A., ed.) W.H. Freeman, Inc., New York, (1992).

Synthetic Peptides: A User's Guide, Second Edition (Grant, G.A., ed.) Oxford University Press, New York (2002).

Special Issue: Allosteric Regulation (Grant, G. A., ed.) Archives Biochem. Biophys. 519/2 (2012).