

Curriculum Vitae
ARTHUR L. DEVRIES

Title: Professor of Animal Biology & Molecular and Integrative Biology

Date of Birth: December 12, 1938

Nationality: U.S.

Education:

Institution and Location	Degree	Year	Major
Stanford University Stanford, California	Ph.D.	1968	Biology
University of Montana Missoula, Montana	B.S. (Honors)	1960	Zoology

Honors and Awards:

University of Montana - Zoology Honors;

Elected member of Explorers Club, 1979.

Elected Fellow of the American Association for the Advancement of Science, May 28, 1984, for distinguished research on biological antifreeze compounds of cold-water fishes.

Evans Visiting Scholar, University of Otago, New Zealand, March 1985.

A newly discovered fish by myself and described named after myself by the famed Russian Ichthyologist, Dr. A.P. Andriashev (1980). Called "*Paralaparis devriesi*".

Awarded the Italian National Antarctic Programme and the *Accademia Nazionale dei Lincei* (*Premio Internazionale 'Felice Ippolito'* (international prize)) June, 2005. The prize was established in memory of Prof. Felice Ippolito, former deputy chairman of the Italian Committee for Antarctic research. It is awarded to an Italian or foreign scientist who significantly contributed to the development of Antarctic research. It consists of a gold medal and a diploma.

Other Bibliographical Data:

American Association for Advancement of Science,
Society for Cryobiology,
American Society of Zoologists
American Physiological Society
Member of Editorial Board of Fish Physiology and Biochemistry (1984-1990)
Editorial Board of Cryobiology (1986-1988)

Reviewer for NSF proposals (Physiological Processes Section) and US Department of Agriculture
Competitive Grants Program (Environmental Stress Section)

Committee Service:

Member of the users committee for the National Science Foundation, Science,
Engineering, and Technology Center, McMurdo Station, Antarctica
determined by the users committee of which I was a member.
Academic Senate, University of Illinois, Urbana (2003-05)

Teaching Experience:

Animal Physiology - Undergraduate course for juniors and seniors.

Comparative Physiology - Graduate course.

Physiological Measurements - Graduate course.

Honors Biology, Undergraduate course for sophomores.

Marine Molecular Biology – ONR summer course, University of Southern California Marine station,
Catalina Island, 1992.

Antarctic Polar Biology course – NSF Crary Science Lab, McMurdo Station, Antarctica, 1994, 1995.

Instructor In Copenhagen University, Marine Biology Course (4 weeks) at Arctic
Research Station, Godhelm, Disco Island, Greenland (June 24, July 24, 2000).

Structure-function, Undergraduate course for School of Integrative Biology majors (2005).

Research Support (recent)

NSF OPP 9317629, Title: The role of antifreeze proteins in freezing avoidance of Antarctic fishes (Total award, \$474,953), 6/1,1994 –11/ 30, 1997); Principal investigator, A.L. DeVries.

Airforce Office of Scientific Research. Title: Structure-Function Studies of Native and Recombinant Fish Antifreeze Proteins 3/1/95 --2/28/96 (Total award, \$120,000); Joint with Chi-Hing C. Cheng-DeVries.

NSF OPP 96- Role of Antifreeze Proteins in Freezing Avoidance in Antarctic Fishes: Ecological and Organismal Physiology, Structure-Function and Mechanism, Genetics and Evolution. 7/1/97--6/30/00 (Total award, \$621,482), Joint with C-H, Cheng.

NSF OPP-9909841.. Antifreeze Proteins in Antarctic Fishes: Ecological and organismal physiology, structure-function, genetics and evolution . (Total Awardt: \$570,961) ---7/1/00-6/30/03 Co-P.Is: C.-H.C. Cheng and A.L. DeVries.

UIUC Critical Research Initiative. Directed evolution and potential economic applications of enhanced antifreeze proteins . /1/2001-12/31/2003. (Total award, \$149,5047) P.I.: C.-H.C. Cheng, co-P.I. s: H. Zhao, D. Bush, S. Korban, H. Hua and A.L. DeVries.

NSF OPP- 00231006 Title: Antifreeze Proteins in Antarctic Fishes: Integrated Studies of Freezing Environments and Organismal Freezing Avoidance, Protein Structure-Function and Mechanism, Genes and Evolution". 2003-06 (Total award, \$649,000) Co-P.I.'s: A.L. DeVries and C.-H.C. Cheng. Additional \$80,000 supplement, 2005.

NSF OPP 06 Title: Antifreeze proteins in Antarctic fish: Integrated studies of environment, freezing avoidance, physiology, protein structure-function and evolutionary genomics. (**\$525,000**) 7/1/07-6/30-10 Co_PIs, **A.L. DeVries and C.-H.C. Cheng.**

Human Frontiers Science Program. Cheating the cold. How do Antarctic fishes use antifreeze to survive in ice-laden water? Prof Margaret Brimble, Organic Chem., Auckland University, NZ. PI), Art DeVries Co-PI. Total amount awarded \$750,000 (US) total for 3 years, (U of Illinois share \$261,000 for 3 years). July, 2009-2012.

Research and Professional Experience:

Professor of Animal Biology -present)

Professor of Physiology (1985 present)

Associate Professor of Physiology (1979-1985)

Assistant Professor of Physiology (September 1976-1979)

Department of Physiology and Biophysics, University of Illinois.

Associate Research Physiologist (1971-1976)

Physiological Research Laboratory of Marine Biology Research Division,
University of California, San Diego.

Three years as principal investigator on the project entitled "The Role of Glycoproteins in the Survival of Cold Water Fishes". Three years as principal investigator on the project entitled "The Physiology and Biochemistry of Freezing Resistance in Antarctic Fishes". Most of these studies were concerned with identifying the antifreeze substances which protect cold water fishes from freezing. Part of these studies were centered around elucidating the structure of the freezing modifying glycoproteins and investigating the relationship of their structure to their freezing behavior.

Assistant Research Biochemist (1970-71) at University of California, Davis.

- Continued work on the structure of the glycoproteins.

National Institutes of Health Postdoctoral Fellow (1968-1969) at University of California, Davis.

Purification of the glycoproteins at which time their
chemical and physical properties were partially characterized.

Department of Biological Science, Ph.D. Program (1963-1968) at Stanford

University. Training and research in environmental physiology and
biochemistry, including work in biochemistry in the Stanford Medical School.

During this period the glycoproteins were discovered and their unusual
depression of the freezing point of water described.

PUBLICATIONS:

1. DeVries, A. L. and Wohlschlag, D. E. (1964) Diving depths of the Weddell seal. *Science* **145**, 292.
2. Somero, G. N. and DeVries, A. L. (1967) Temperature tolerance of some Antarctic fish. *Science* **156**, 257-258.
3. DeVries, A. L. and Wohlschlag, D. E. (1969) Freezing resistance in some Antarctic fishes. *Science* **163**, 1073-1075.
4. Dayton, P. K., Robilliard, G. A. and DeVries, A. L. (1969) Anchor ice formation in McMurdo Sound, Antarctica, and its biological effects. *Science* **163**, 273-274.
5. DeVries, A. L. (1969) Freezing resistance in fishes of the Antarctic peninsula. *U.S. Antarctic. J.* **4(4)**.
6. DeVries, A. L., Komatsu, S. K. and Feeney, R. E. (1970) Chemical and physical properties of freezing point-depressing glycoproteins from Antarctic fishes. *J. Biol. Chem.* **245**, 2901-2908.
7. Komatsu, S. K., DeVries, A. L. and Feeney, R. E. (1970) Studies of the structure of freezing point-depressing glycoproteins from an Antarctic Fish. *J. Biol. Chem.* **245**, 2909-2913.
8. DeVries, A. L. (1970) Freezing resistance in antarctic fishes. In *Antarctic Ecology*, Vol. 1 (M.W. Holdgate, ed.), Academic Press, New York, 320-328.
9. DeVries, A.L. (1971) Glycoproteins as biological antifreeze agents in Antarctic fishes. *Science* **172**, 1152-1155.
10. DeVries, A. L., Vandenheede, J. and Feeney, R. E. (1971) Primary structure of freezing point-depressing glycoproteins. *J. Biol. Chem.* **246**, 305-308.
11. DeVries, A. L. (1971) Freezing resistance in fishes In *Fish Physiology* (W.S. Hoar and D.J. Randall, eds.), Academic Press, New York, Vol. 6, pp. 157-190.
12. DeVries, A. L. and Somero, G. N. (1971) The physiology and biochemistry of low temperature adaptation in Antarctic marine organisms. In *Proceedings of the*

SCAR Symposium on Antarctic Ice and Water Masses (ed. Sir George Deacon), published by Scientific Committee on Antarctic Research, pp. 101-113.

13. Lin, Y., Duman, J. G. and DeVries, A. L. (1972) Studies on the structure and activity of low molecular weight glycoproteins from an Antarctic fish. *Biochem. Biophys. Res. Commun.* **46**, 89-92.
14. Shier, W. T., Lin, Y. and DeVries, A. L. (1972) Structure and mode of action of glycoproteins from Antarctic fishes. *Biochim. Biophys. Acta* **263**, 406-413.
15. DeVries, A. L., Checkley, D. M. and Raymond, J. A. (1972) Physiology and biochemistry of freezing resistance in Antarctic fishes. *U.S. Antarctic J.* **7(4)**, 78-79.
16. Raymond, J. A. and DeVries, A. L. (1972) Freezing behavior of fish blood glycoproteins with antifreeze properties. *Cryobiol.* **9**, 541-547.
17. Duman, J. and DeVries, A. L. (1974) Freezing resistance in winter flounder, *Pseudopleuronectes americanus*. *Nature* **247**, 237-238.
18. Lin, Y. L. and DeVries, A. L. (1974) Preparation of ³H-labeled serum glycoproteins from Antarctic fish. *Biochem. Biophys. Res. Commun.* **59**, 1192-1196.
19. Dobbs, G. H., Lin, Y. L. and DeVries, A. L. (1974) Agglomerularism in Antarctic fish. *Science* **185**, 793-794, 1974.
20. Lin, Y., Dobbs, G. H. and DeVries, A. L. (1974) Oxygen consumption and lipid content in red and white muscles of Antarctic fishes. *J. Exp. Zool.* **189**, 379-386.
21. DeVries, A. L. (1974) Homeostasis. In McGraw-Hill Yearbook of Science and Technology, McGraw-Hill Book Co., Inc., pp. 223-225.
22. Duman, J. and DeVries, A. L. (1974) The effects of temperature and photoperiod on antifreeze production in cold water fishes. *J. Exp. Zool.* **190**, 89-97.
23. DeVries, A. L., Lin, Y., Dobbs, G. H. and Raymond, J. A. (1974) Studies of the Antarctic cod *Dissostichus mawsoni*. *U.S. Antarctic J.* **9(4)**, 107-108.

24. DeVries, A. L. (1974) Survival at Freezing Temperatures. In *Biochemical and Biophysical Perspectives in Marine Biology* (D. C. Malins and J. R. Sargent, eds.), Academic Press, London, Vol. 1, pp. 290-330.
25. Dobbs, G. H. and DeVries, A. L. (1975) Renal function in Antarctic teleost fishes: Serum and urine composition. *Mar. Biol.* **29**, 59-70.
26. Dobbs, G. H. and DeVries, A. L. (1975) The aglomerular nephron of the Antarctic teleosts: A light and electron microscopic study. *Tissue and Cell* **7(1)**, 159-170.
27. Shier, W. T. and DeVries, A. L. (1975) Carbohydrate of antifreeze glycoproteins from an Antarctic fish. *FEBS Letters* **54**, 135.
28. Raymond, J. A. and DeVries, A. L. (1975) Spontaneous emulsification of oil by freezing. *Int. J. Colloid. Sci.* **52**, 406-409.
29. Raymond, J. A., Lin, Y. and DeVries, A. L. (1975) Glycoproteins and protein antifreeze in two Alaskan fishes. *J. Exp. Zool.* **193**, 125-130.
30. Duman, J. G. and DeVries, A. L. (1975) The role of macromolecular antifreezes in cold water fishes. *Comp. Biochem. Physiol.* **52A**, 193-199.
31. Qvist, J., Zapol, W. M. and DeVries, A. L. (1975) Control of oxyhemoglobin dissociation in Antarctic fishes during acidosis and thermal acclimation. *U.S. Antarctic J.*
32. Raymond, J. A. and DeVries, A. L. (1976) Some Respiratory characteristics of the blood of four Antarctic fishes. *J. Exp. Zool.* **196**, 393-396.
33. Lin, Y., Raymond, J. A., Duman, J. G. and DeVries, A. L. (1976) Compartmentalization of NaCl in frozen solutions of antifreeze glycoproteins. *Cryobiol.* **13**, 334-340.
34. Duman, J. G. and DeVries, A. L. (1976) Isolation, characterization, and physical properties of protein antifreezes from the winter flounder, *Pseudopleuronectes americanus*. *Comp. Biochem. Physiol.* **53B**, 375-380.
35. DeVries, A. L. (1976) Antifreezes in cold-water fishes. *Oceanus* **19(4)**, 23-31.

36. Raymond, J. A. and DeVries, A. L. (1976) Bioluminescence in McMurdo Sound, Antarctica. *Limnology and Oceanography* **21**, 599-603.
37. DeVries, A. L. (1977) The physiology of cold adaptation in polar marine poikilotherms. In *Polar Oceans*, (ed. J. J. Dunbar), Proceedings of the Polar Oceans Conference held at McGill University, Montreal, May 1974, pp. 409-422.
38. Raymond, J. A. and DeVries, A. L. (1977) Adsorption inhibition as a mechanism of freezing resistance in polar fishes. *Proc. Natl. Acad. Sci. USA* **74**, 2589-2593.
39. Qvist, J., Weber, R. E., DeVries, A. L. and Zapol, W. M. (1977) pH and haemoglobin oxygen affinity in blood from the Antarctic cod *Dissostichus mawsoni*. *J. Exp. Biol.* **67**, 77-88.
40. Raymond, J. A., Radding, W. and DeVries, A. L. (1977) Circular dichroism of protein and glycoprotein fish antifreeze. *Biopolymers* **16**, 2575-2578.
41. Haschemeyer, A.E.V., Guschlbauer, W. and DeVries, A. L. (1977) Water binding by antifreeze glycoproteins from Antarctic fish. *Nature* **269**, 87-88.
42. DeVries, A. L. (1977) Role of glycoprotein and peptide antifreezes in the survival of polar fishes. *U.S. Antarctic J.* **13(4)**, 17-18.
43. DeVries, A. L. and Lin, Y. (1977) Structure of a peptide antifreeze and mechanism of adsorption to ice. *Biochim. Biophys. Acta* **495**, 388-392.
44. DeVries, A. L. and Lin, Y. (1977) The role of glycoprotein antifreezes in the survival of Antarctic fishes. In *Adaptation within Antarctic Ecosystems*, ed. G. A. Llano, The Proceedings of the Third Symposium on Antarctic Biology, Gulf Publishing Co., Houston. pp. 439-458.
45. DeVries, A. L. and Eastman, J. E. (1978) Lipid sacs as a buoyancy adaptation in an Antarctic fish. *Nature* **271**, 352-353.
46. DeVries, A. L. (1978) Physiology and biochemistry of low temperature adaptation in polar marine ectotherms. In *Polar Research*, ed. M. A. McWhinnie. Proceedings of AAAS Symposium "Polar Research: To the Present and the Future", pp. 1-16.

47. Van Voorhies, W. V., Raymond, J. A. and DeVries, A. L. (1978) Glycoproteins as biological antifreeze agents in the cod, *Gadus ogac*. *Physiol. Zool.* **51**, 347-353.
48. DeVries, A. L. (1979) The effect of naphthalene on synthesis of peptide antifreeze in the Bering Sea sculpin, *Myoxocephalus verrucosus*. In *Pollution and Physiology of Marine Organisms*, eds. W. B. Vernberg and A. Calabrese, Academic Press, pp. 53-67.
49. Hudson, A. P., DeVries, A. L. and Haschemeyer, A.E.V. (1979) Antifreeze glycoprotein biosynthesis in Antarctic fishes. *Comp. Biochem. Physiol.* **62B**, 179-183.
50. Eastman, J. T., DeVries, A. L., Coalson, R. E., Nordquist, R. E. and Boyd, R. B. (1979) Renal conservation of antifreeze peptide in Antarctic eelpout, *Rhigophila dearborni*. *Nature* **282**, 217-218.
51. Bruckhausen, P. M., Raymond, J. A., Jacobs, S. S., DeVries, A. L., Thorndike, E. M. and DeWitt, H. H. (1979) Fish, crustaceans, and the sea floor under the Ross Ice Shelf. *Science* **203**, 449-451.
52. Berman, E., Allerhand, A., DeVries, A. L. (1980) Natural abundance carbon 13 nuclear magnetic resonance spectroscopy of antifreeze glycoproteins. *J. Biol. Chem.* **225 (10)**, 4407-4410.
53. DeVries, A. L. (1980) Biological antifreezes and survival in freezing environments. In *Animals and Environmental Fitness*. Pergamon Press, New York, pp. 583-607,
54. Duman, J., Patterson, J., Kozak, J., DeVries, A. L. (1980) Isopiestic determinations of water binding by fish antifreeze glycoproteins. *Biochim. Biophys. Acta* **626**, 332-336.
55. Boyd, R. B., DeVries, A. L., Eastman, J. T., Pietra, G. G. (1980) The secondary lamellae of the gills of cold water (high latitude) teleosts. *Cell and Tissue Res.* **213**, 361-367.
56. Newman, R. A., Fricke, U., Klein, P. J., Uhlenbuck, G., DeVries, A. L. (1980) Studies on the fate of asialoglycoproteins in the circulation of the mouse. *J. Clin. Chem. and Clin. Biochem.* **18**, 31-37.

57. Petzel, D. H., Reisman, M. M., DeVries, A. L. (1980) Seasonal variation of antifreeze peptide in the winter flounder, *Pseudopleuronectes americanus*. *J. Exp. Zool.* **211**, 63-69.
58. Petzel, D. H. and DeVries, A. L. (1980) Renal handling of anionic and cationic antifreeze peptides in the glomerular winter flounder. *The Bulletin, Mount Desert Island Biological Laboratory* **20**, 17-18.
59. DeVries, A. L. and Eastman, J. T. (1981) Physiology and ecology of Notothenioid fishes of the Ross Sea, Antarctica. *J. Roy. Soc. New Zealand* **11 (4)**, 329-340.
60. Eastman, J. T. and DeVries, A. L. (1981) Buoyancy adaptations in a swim-bladderless Antarctic fish. *J. Morphology* **167**, 91-102.
61. O'Grady, S. M., DeVries, A. L. (1982) Osmotic and ionic regulation in polar fishes. *J. Exp. Marine Biol. Ecol.* **57**, 219-228.
62. Eastman, J. T. and DeVries, A. L. (1982) Hepatic ultrastructural specialization in Antarctic fishes. *Cell and Tissue Res.* **219**, 489-496.
63. O'Grady, S. M., Clarke, A., DeVries, A. L. (1982) Characterization of glycoprotein antifreeze biosynthesis in isolated hepatocytes from *Pagothenia borchgrevinki*. *J. Exp. Zool.* **220**, 179-189.
64. O'Grady, S. M., Ellory, J. C., DeVries, A. L. (1982) Protein and glycoprotein antifreezes in intestinal fluid of polar fishes. *J. Exp. Biol.* **98**, 429-438.
65. Schrag, J. D., O'Grady, S. M., DeVries, A. L. (1982) Relationship of amino acid composition and molecular weight of antifreeze glycopeptides to non-colligative freezing point depression. *Biochim. Biophys. Acta* **717**, 322-326.
66. Schrag, J. D. and DeVries, A. L. (1982) The effects of freezing rate on the cooperativity of antifreeze glycopeptides. *Comp. Biochem. Physiol.* **74A**, 381-385.
67. DeVries, A. L. (1982) Biological antifreeze agents in cold water fishes. *Comp. Biochem. Physiol.* **73A**, 627-640.
68. O'Grady, S. M., Schrag, J. D., Raymond, J. A., DeVries, A. L. (1982) Comparison of antifreeze glycopeptides from Arctic and Antarctic fishes. *J. Exp. Zool.* **224**, 177-185.

69. Eastman, J. T. and DeVries, A. L. (1982) Buoyancy studies of Notothenioid fishes in McMurdo Sound, Antarctica. *Copeia* **19** (2), 385-393.
70. O'Grady, S. M., Ellory, J. C., and DeVries, A. L. (1983) The role of low molecular weight antifreeze glycopeptides in the bile and intestinal fluid of Antarctic fishes. *J. Exp. Biol.* **104**, 149-162.
71. DeVries, A. L. (1983) Biological antifreeze agents. *Ann. Rev. Physiol.* **45**, 245-260.
72. Boyd, R. B. and DeVries, A. L. (1983) The seasonal distribution of anionic binding sites in the basement membrane of the kidney glomerulus of the winter flounder *Pseudopleuronectes americanus*, *Cell Tissue Res.* **234**, 271-277.
73. Knight, C. A., DeVries, A. L. and Oolman, L. D. (1984) Fish antifreeze protein and the freezing and recrystallization of ice. *Nature* **308**, 295-296.
74. DeVries, A. L. (1984) Role of glycopeptide and peptides in inhibition of crystallization of water in polar fishes. *Trans. Roy. Soc. Lond.* **B304**, 575-588.
75. Burchett, M. S., A. L. DeVries and Briggs, A. J. (1984) Age determination and growth of *Dissostichus mawsoni* (Norman, 1937) from McMurdo Sound, Antarctica. *Cybiurn* **8(1)**, 27-31.
76. Ahlgren, J. A. and DeVries, A. L. (1984) Comparison of antifreeze glycoproteins from several Antarctic fishes. *Polar Biol.* **3**, 93-97.
77. Tetens, V., Wells, R.M.G and DeVries, A. L. (1984) Antarctic fish blood Respiratory properties and effects of thermal acclimation. *J. Exp. Biol.* **102**, 265-279.
78. Wells, R. M. G., Tetens, V. and DeVries, A. L. (1984) Recovery from stress following capture and anaesthesia of Antarctic fish: Hematology and blood chemistry. *J. Fish Biol.* **25**, 567-576.
79. Clarke, A., Doherty, N., DeVries, A. L. and Eastman, J. T. (1984) Lipid content and composition of three species of Antarctic fish in relation to buoyancy. *Polar Biol.* **3**, 77-83.

80. Gourlie, B., Lin, Y., Powers, D., DeVries, A. L. and Haung, R. C. (1984) Winter flounder antifreeze protein: Evidence for a multigene family. *J. Biol. Chem.* **259**, 14960-14965.
81. Williams, R. C., Correia, J. J., and DeVries, A. L. (1985) Formation of microtubules at low temperature by tubulin from antarctic fishes. *Biochemistry* **24**, 2790-2798.
82. Eastman, J. T. and DeVries, A. L. (1985) Adaptations for cryopelagic life in the Antarctic Notothenioid fish, *Pagothenia borchgrevinki*. *Polar Biology* **4**, 45-52.
83. Turner, J. D., Schrag, J. D. and DeVries, A. L. (1985) Ocular freezing avoidance in antarctic fishes. *J. Exp. Biol.* **118**, 121-132.
84. Homans, S. W., DeVries, A. L. and Parker, S. B. (1985) Solution structure of antifreeze glycopeptides: Determination of major conformers of the glycosidic linkages. *FEBS* **183**, 133-137.
85. Knight, C. A. and A. L. DeVries (1985) Growth forms of large frost crystals in the Antarctic. *J. Glaciology.* **31**, 127-135.
86. DeVries, A. L. (1986) Glycopeptide and peptide antifreeze - Interaction with ice. *Methods Enzymol.* **127**, 293-303 (Editors, S. P. Colowick and N. O. Kaplan).
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90. Eastman, J. T., Boyd, R. B. and DeVries, A. L. (1987) Renal corpuscle development in boreal fishes with and without antifreezes. *Fish Physiol. Biochem.* **4**, 89-100.
91. Schrag, J. D., Cheng, C.-H. C., Panico, M., Morris, H. R. and DeVries, A. L. (1987) Primary and secondary structure of antifreeze peptides from arctic and antarctic zoarcid fishes. *Biochim. Biophys. Acta* **915**, 357-370.

92. Ahlgren, J. A., Cheng, C.-H. C., Schrag, J. D. and DeVries, A. L. (1988) Freezing avoidance and the distribution of antifreeze glycopeptides in body fluids and tissues of antarctic fish. *J. Exp. Biol.* **137**, 549-563.
93. DeVries, A. L. (1988) The role of antifreeze glycopeptides and peptides in the freezing avoidance of Antarctic fishes. *Comp. Biochem. Physiol.* **90B**, 611-621.
94. Knight, C. A., Hallet, J. and DeVries, A. L. (1988) Solute effects on ice recrystallization: An assessment technique. *Cryobiol.* **25**, 55-60.
95. Knight, C. A. and DeVries, A. L. (1988) The prevention of ice crystal growth from water by "antifreeze proteins", in *Atmospheric Aerosol and Nucleation* (Ed. Wagner, P. E. and Valli, G.), pp. 717-720, Springer-Verlag, Berlin.
96. Eastman, J. T. and DeVries, A. L. (1989) Ultrastructure of the lipid sac wall in the Antarctic Notothenioid fish *Pleuragramma antarcticum*. *Polar Biol.* **9**, 1-39.
97. Parody-Morreole, A., Murphy, K. P., DiCerca, E., Fall, R., DeVries, A. L. and Gill, S. J. (1988) Inhibition of bacterial ice nucleators by fish antifreeze glycoproteins. *Nature* **333**, 782-783.
98. Raymond, J. A., Wilson, P. W. and DeVries, A. L. (1989) Inhibition of growth of non-basal planes in ice by fish antifreeze. *Proc. Natl. Acad. Sci. USA* **86(3)**, 881-885.
99. Cheng, C.-H. C. and DeVries, A. L. (1989) Structures of antifreeze peptides from the antarctic eel pout, *Austrolycithys brachycephalus*. *Biochim. Biophys. Acta* **997**, 55-64.
100. Knight, C. A. and DeVries, A. L. (1989) Melting inhibition by fish antifreeze glycopeptide. *Science*, **254**, 505-507.
101. Boyd, R. B., Atkin, J., Thompson, V. W. and DeVries A. L. (1990) Absence of binding and impermeability to ferritins of gill endothelium in marine teleosts. *Fish Physiol. Biochem.* **8**, 53-60.
102. Hsiao, K. C., Cheng, C.-H.C., Fernandes, I. E., Detrich, H. W., and DeVries, A. L. (1990) An antifreeze glycopeptide gene from the Antarctic cod *Notothenia corricep neglecta* encodes a polyprotein of high peptide copy number. *Proc. Natl. Acad. Sci. USA*, **87**, 9265-9269.

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164. Nagel, L., Plattner, C., Budke, C., Majer, S., **DeVries, A.L.**, Koop, T. and Sewald,

N. (2011) Synthesis and characterization of natural and modified antifreeze glycopeptides – glycosylated foldamers. *Amino Acids* (in press).

Invited lectures:

1. The role of biological antifreezes in freezing avoidance of fishes. In *Symposium of Temperature and Fish* at the 1982 American Physiological Society Meetings, San Diego, Sep. 1981.
2. Role of glycopeptides and peptides in inhibition of crystallization of water in polar fishes. In symposium on *Mineral Phases in Biology*, Royal Society of London, U.K., June, 1983.
3. The role of antifreeze glycopeptides and peptides in the survival of cold water fishes. In *Symposium Life at Low Temperatures*. International Society for Cryobiology, Annual Meeting, San Diego, Aug.1984.
4. The role of antifreeze glycopeptides and peptides in the freezing avoidance of Antarctic fishes. In the *International Conference on Marine Biology of Antarctica*, Naples, Italy, October, 1986.
5. Role of antifreeze glycopeptides and peptides in freezing avoidance of Antarctic fishes. In the *Marine Biology Minisymposium*, Marine Sciences Department, University of Southern California, April, 1987.
6. Survival in freezing environments. In the *Special Symposium on Adaptation to the Environment*, Joint Oceanographic Assembly, Acapulco, Mexico, Aug. 1988.
7. Freezing avoidance in Antarctic fishes. In *Symposium on Antarctic Marine Biology*, Meeting of the American Society of Zoologists, San Francisco, California, Dec. 1988.
8. Inhibition of ice crystal growth by fish antifreezes. In *Symposium on Surface Reactive Peptides and Polymers*, American Chemical Society, Dallas, Texas, April, 1989.
9. The role of antifreeze glycopeptides and peptides in the survival of cold-water fishes. In the 19th Meeting of the Federation of European Biochemical Societies,

Rome, Italy, July, 1989.

10. The Role of Antifreeze Peptides and Glycopeptides in Antarctic Fishes, *The Second International Ravello Conference: Biology of Antarctic Fishes*, Ravello (Naples, Italy) May, 1990.
11. Inhibition of ice crystal growth by antifreeze proteins. *Symposium on Interaction of Proteins and Ice*, at the 27th Annual Meeting of the Society for Cryobiology, Binghamton, New York, June, 1990.
12. International Conference on Comparative Physiology. *Symposium on Water and Life: Comparative Analysis of Water Relationships at the Organismic, Cellular and Molecular Level*. Organizers: George Somero and Berry Osmond, Sep. 1990.
13. Invited lectures for a course on "The Marine Environment and Biotechnology" at Stazione Zoologica "Anton Dohrn", Napoli, Italy, May, 1991.
14. The Role of Antifreeze Proteins in the Survival of Antarctic Fishes. Invited Symposium lecture at the 5th (SCAR-Scientific Committee on Antarctic Research) *Antarctic Biology Symposium*, Venice Italy, May, 1994.
15. Fish Antifreeze Proteins. *Symposium on Subzero temperature adaptations of poikilothermic organisms*, American Physiological Society Intersociety Meeting, San Diego, Nov. 1994.
17. Antarctic Fishes Frozen But Alive and Well. Lecture given at McMurdo Station, Antarctica. Office of Polar Programs, National Science Foundation site visit by Head of National Science Foundation.
18. Life on Ice. Invited presentation at the *Fifth Annual Winter Wilderness Medicine conference of the Wilderness Medical Society*. Keystone Resort, Keystone Colorado, Feb. 1995.
19. Antifreeze Gene Structures and Organization in Antarctic Fishes Provide the Basis for Antifreeze Protein Heterogeneity and Abundance. Given by C.-H.C. Cheng-DeVries. Society for Experimental Biology Annual Meeting, University of St Andrews, UK, April, 1995.

20. Antifreeze Proteins. In *Symposium Life under Extreme Environments*. European Comparative Physiology and Biochemistry Society Intl. Meeting. Tulon, France, June, 1995.
21. Antarctic Fishes: Frozen but Alive and Well., McMurdo Sound, Science and Engineering Center, McMurdo Station. Oct, 1999.
22. Antarctic Fishes: Frozen but Alive and Well. Workshop on Life in the Cold at Aspen, Colorado, sponsored by US Army. Invited talk. April, 1999.
23. Society for Integrative and Comparative Biology. *Symposium on Antarctic Marine Biology*. Freezing Avoidance In Polar Fishes. Invited lecture. Atlanta, Georgia, Jan. 2000.
24. Fisheries Society of the British Isles *Symposium on Polar Fish Biology*. Comparison of Arctic and Antarctic Fish Freezing Avoidance. Cambridge University, Cambridge England, Aug, 2000.
24. The role of antifreeze proteins in freezing avoidance of polar fishes". Invited lecture. American Physiological Society Annual Meeting, *Symposium on Molecular Biology of Polar Organisms*, San Diego, California. Aug. 24, 2002.
25. Comparison of Antifreeze Proteins in Antarctic and Arctic Fishes. Symposium on "Life at Environmental Extremes". American Physiological Society Meeting, New Orleans, April 2002.
27. Participated and presented in a NSF OPP sponsored workshop on feasibility of LTER for McMurdo Sound, Antarctica, San Jose, CA. April, 2004.
28. National Science Foundation, Crary Laboratory, McMurdo Station, Lecture for National Science Board Visitors, New Developments in Freeze Avoidance in Antarctic Fishes. Dec, 2004.
29. Antifreeze proteins in polar fishes. 1st *International Symposium on the Environmental Physiology of Ectotherms and Plants (ISEPEP1)*, Copenhagen, Denmark, July, 2005.
30. Cold Adaptation and Biological Antifreeze Systems. 4th Max Planck Symposium "Life Under Extreme Conditions". Max Planck Society, Berlin, Germany March ,2011.

Invited Seminars:

1. Department of Physiology, SUNY, Buffalo. The role of glycopeptides and peptides in freezing avoidance of cold water fishes. April, 1984.
2. Huntsman Marine Laboratory, Brandy Cove, New Brunswick. Freezing avoidance in polar fishes. June, 1984.
3. Freezing avoidance in fishes, Gordon Research Conference, Temperature stress in plants. June, 1984.
4. Role of glycopeptides and peptides in freezing avoidance of cold water fishes. Department of Physiology, University of Otago, New Zealand, March, 1985.
5. Cold adaptation in Antarctic fishes. Department of Zoology, University of Otago, New Zealand, April, 1985.
6. Role of glycopeptides and peptides in freezing avoidance of cold water fishes. Department of Zoology, University of Maine, Orono, Maine, April, 1986.
7. Biological antifreezes in cold water fishes. Department of Zoology, University of Maryland, Baltimore, MD, May, 1987.
8. Role of antifreeze glycopeptides and peptides in inhibition of ice crystal growth. Ice Biologicals Section, Eastman Kodak Co., Rochester, New York, May, 1988.
9. Role of antifreeze peptides and glycopeptides in freezing avoidance of polar fishes. Department of Agronomy, Cornell University, Ithaca, New York, May, 1988.
10. Role of antifreeze glycopeptides and peptides in freezing avoidance of cold water fishes. Department of Anatomy, University of Chicago, Chicago, Illinois, February, 1989.
11. The role of antifreeze protein in freezing avoidance of cold-water fishes. Department of Biology, University of Cincinnati, Cincinnati, Ohio, April, 1989.
12. The role of antifreeze protein in freezing avoidance of cold water fishes. Department of Biology, Miami University, Miami, Ohio, April, 1989.

13. The role of antifreeze proteins in freezing avoidance of cold water fishes. Bodega Marine Station, University of California, Davis, June, 1989.
14. The role of antifreeze proteins in freezing avoidance of coldwater fishes. Zoology Department, University of California, Davis, June, 1989.
15. The effect of antifreeze peptides and glycopeptides on ice crystal growth. The Nutra Sweet Company, Mount Prospect, Illinois, December, 1989.
16. Freezing Avoidance in Polar Fishes, Biology Department, Lake Forest College, Lake Forest, Illinois, June, 1990
17. Inhibition of Ice Crystal Growth by Antifreeze Proteins. DNAPlant Technology, Oakland, California, April, 1991.
18. Role of antifreeze proteins in freezing avoidance of polar fishes. Dept. of Physiology, University of Rochester, New York, July, 1992.
19. The Role of Antifreeze Glycopeptides in Freezing Avoidance of Antarctic Fishes. The Department of Biochemistry, Queens College, Kingston, Canada, September, 1994.
20. Antarctic Fishes: Frozen but Alive and Well. Antarctic Science Lecture Series, US Antarctic Program and the Canterbury Museum, Christchurch, New Zealand, October, 1998.
21. Freezing Avoidance in Polar Fishes. US Antarctic Research Program, Crary Science Center, McMurdo Station Antarctica, October, 1998.
22. Freezing Avoidance in Polar Fishes, Department of Ecology, Ethology and Evolution, University of Kansas, Lawrence Ka. May, 1999.
23. Auckland University, New Zealand: *Antarctica: The Frozen Continent (Public Lecture series on Science In Antarctica)*. Life at the Frozen edge: How Antarctic animals avoid freezing (Feb 2002).
24. Sigma XI Lecture at Abbott Drug Company Sigma XI Chapter, Illinois, "Antarctic Fish: Frozen but Alive and Well" May, 2005.

25. Forty years of Antarctic fish antifreeze research: paleoclimatic history to molecular evolution and new paradigms in teleost freezing avoidance. Lecture given at the Italian National Antarctic Program Workshop for acceptance of the Premio Internazionale “Felice Ippolito” award for major contributions in Antarctic Biological Research. Sept. 2005, Rome, Italy.

Patent :

U.S Patent No. 5,358,931; Issued: October 25, 1994, Interactions of Thermal Hysteresis Proteins with Cells and Cell Membranes and Associated Applications. With Dr. Boris Rubinsky & Amir Arav, University of California, Berkeley, California.