Revised 10/2016

Curriculum Vitae
Rebecca J. Van Beneden

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Education:

1974 - B.S., Biology, Wright State University, Dayton, Ohio
1983 - Ph.D., Biochemistry, Johns Hopkins University, Baltimore, MD

Professional Experience:

1974-1976	Research Assistant, Johns Hopkins School of Medicine, Baltimore, MD
1977-1978	Graduate Teaching Assistant, Johns Hopkins University, Baltimore, MD
1982-1983	Postdoctoral Fellow, Johns Hopkins University, Baltimore, MD
1983-1984	Postdoctoral Fellow at McMaster University, Ontario, Canada as Visiting Fellow, Frederick Cancer Research Facility (NCI/NIH), Laboratory of Molecular Oncology, Frederick, MD
1985-1986	Assistant Research Scientist, Chesapeake Bay Institute, Johns Hopkins University, Shady Side, MD and Scientist I, Program Resources, Inc., Frederick Cancer Research Facility
1986-1988	Assistant Research Scientist, Chesapeake Bay Institute, Johns Hopkins University, Shady Side, MD; Visiting Scientist (Leukemia Society of America Special Fellow) to the Frederick Cancer Research Facility (NCI), Frederick, MD
1988-1993	Research Assistant Professor, Duke University Marine Laboratory, Beaufort, Dept. of Cell Biology, Duke University Medical Center, Durham, NC
1993-2000	Associate Professor, Department of Zoology, University of Maine, (1993-1997); Associate Professor, Dept. of Biochemistry, Microbiology and Molecular Biology & School of Marine Sciences (1997- 2000)
2000-2016	Professor, Department of Molecular and Biomedical Sciences & the School of Marine Sciences; Supervisor, DNA Sequencing Facility (1993-present)
2014-2015	Associate Director, School of Marine Sciences
2015-2016	Interim Director, School of Marine Sciences
2016-present	Director, School of Marine Sciences
2016-present	Cooperating Professor, Department of Molecular and Biomedical Sciences

Other Experience and Professional Memberships

Federal Government Public Advisory Committees: EPA National Scientific Advisory Panel; USDA/CSREES/NRICGP ad hoc Reviewer; NIH/ADAMHA Consultant and ad hoc reviewer; NIH/NCRR Comparative Medicine Review Panel, 2008-2012. Reviewer for NIH Comparative Medicine Special Emphasis Panels (formerly NCRR), NIH, 2009-present.

Professional Societies:

1995-present American Association for the Advancement of Science (AAAS)
1993-present American Association for Cancer Research (AACR)
1993-present Society of Environmental Toxicology and Chemistry (SETAC)
2012-present Sigma Xi

Advisory Boards: Maine Department of Environmental Protection, SWAT (Surface Waters Ambient Toxicity) Program and Dioxin Monitoring Program; MBMS (Maine Biological and Medical Sciences); Affiliated Scientist, MIHGH (Maine Institute of Human Genetics and Health) in Bangor, ME (2008-2011).

Editorial Board: *Aquatic Toxicology*

Honors and Awards:

2015 RISE Center Mentor award
2016 RISE Center Career Award

Teaching Activities:

1994-2000	SMS 587 Marine Molecular Biology
1995	ZOL 385 Molecular Biology of Disease
1997-2014	BMB 280 Introduction to Cellular and Molecular Biology
1998	SMS 598 Environmental Toxicology (Fall 1998)
2015	SMS404 Capstone Seminar
2007-present	SMS 304 Integrated Marine Sciences IV
2016	SMS 491 Arsenic and Other Nasties in the Environment
2016	SMS598 Molecular & Environmental Toxicology

Publications :

1. Kazazian, H.H.Jr., Ginder, G.D., Snyder, P.G., **Van Beneden, R.J**. and Woodhead, A.P. Further evidence of a quantitative deficiency of chain-specific globin mRNA in the Thalassemia syndrome. *Proc. Natl. Acad. Sci. 72*: 567-571, 1975.

2. Kazazian, H.H.Jr., Silverstein, A.M., Snyder, P.G. and **Van Beneden, R.J.** Increasing haemoglobin beta-chain synthesis in foetal development is associated with a declining gamma to alpha mRNA ratio. *Nature 260*: 67-70, 1976.

3. Kazazian H.H.Jr., **Van Beneden R.J**. and Snyder P.G. Beta-thalassemia: studies of the molecular defect in the "D" family. *Johns Hopkins Medical Journal* 139: 211-214, 1976.

4. Charache, S., Fox, J., McCurdy, P., Kazazian, H., Winslow, R. with the assistance of Hathaway,

P., **Van Beneden, R.J**., and Jessop, M. Post-synthetic deamidation of hemoglobin Providence (beta 82 lys -> Asn, Asp) and its effect on oxygen transport. *J. of Clinical Invest. 59*: 652-658, 1977.

5. Palumbi, S.R., Sidell, B.D., **Van Beneden, R.J**., Smith, G.D. and Powers, D.A. Glucosephosphate isomerase (GPI) of the teleost *Fundulus heteroclitus* (Linnaeus): Isozymes, allozymes, and their physiological roles. *J. Comp. Physiol. 138*: 49-57, 1980.

6. **Van Beneden, R.J**., Cashon, R.E. and Powers, D.A. Biochemical genetics of *Fundulus heteroclitus* (L.) III. Inheritance of Isocitrate dehydrogenase (Idh-A and Idh-B), 6-phosphogluconate dehydrogenase (6-Pgdh-A), and serum esterase (Est-S) polymorphisms. *Biochemical Genetics 19*: 701-714, 1981.

7. Cashon, R.E., **Van Beneden, R.J**. and Powers, D.A. Biochemical genetics of *Fundulus heteroclitus* (L.) IV. Spatial variation of gene frequencies of Idh-A, Idh-B, 6-Pgdh-A, and Est-S. *Biochemical Genetics 19*: 715-728, 1981.

8. **Van Beneden, R.J.** and Powers, D.A. Purification and kinetic characterization of the isozymes of glucosephosphate isomerase from the teleost *Fundulus heteroclitus*. *J. Biol. Chem. 260*: 14596-14603, 1985.

9. **Van Beneden, R.J**., Watson, D.K., Sonstegard, R.A., Chen, T.T. and Papas, T.S. Isolation and characterization of the rainbow trout *c-myc* oncogene. *Marine Environ. Res. 17:* 333-334, 1985.

10. Chen, T.T., **Van Beneden, R.J**., Agellon, L.B., Howard, D.A. and Sonstegard, R.A. Molecular Toxicology: A New Frontier. In: Proceedings of the Symposium on New and Innovative Advances in Biology/Engineering with Potential for Use in Agriculture, NOAA, 1985.

11. Chen, T.T., Reid, P.C., **Van Beneden, R.J.** and Sonstegard, R.A. Effect of Aroclor 1254 and Mirex on estradiol-induced vitellogenin production in juvenile trout (*Salmo gairdneri*). *Can. J. Fish. and Aquatic Sci. 43*: 169-173, 1986.

12. **Van Beneden, R.J**., Watson, D.K., Chen, T.T., Lautenberger, J.A. and Papas, T.S.: Cellular *myc* (c-*myc*) in fish (rainbow trout): Its relationship to other vertebrate *myc* genes and to the transforming genes of the MC29 family of viruses. *Proc. Natl. Acad. Sci. USA 83*: 3698-3702, 1986.

13. Powers, D.A., Ropson, I., Brown, D.C., **Van Beneden, R.J**., Cashon, R.E., Gonzalez-Villasenor, L. and DiMichele, J. Genetic variation in *Fundulus heteroclitus*: Geographic distribution. *American Zoologist 26*: 131-144, 1986.

14. **Van Beneden, R.J.,** Watson, D.K., Chen, T.T. and Papas, T.S. The cellular *myc* oncogene of rainbow trout. In: Puett, D., Ahmad, F., Black, S., Lopez, D.M., Melner, M.H., Scott, W.A., and Whelan, W.J. (eds.), Advances in Gene Technology: Molecular Biology of the Endocrine System. Cambridge University Press, Cambridge, pp.156-157, 1986.

15. Papas, T.S., Lautenberger, J.A., Watson, D.K., **Van Beneden, R.J**., Psallidopoulos, M., Fisher, R.J., Fujiwara, S., Samuel, K., Kan, N., Flordellis, C., Zhou, R.P., Duesberg, P., Seth, A., and

Ascione, R. Viral *myc* genes and their cellular homologs. In: Papas, T.S., and Vande Woude, G.F. (eds.), Gene Amplification and Analysis, Vol. 4, Oncogenes. New York, Elsevier/North Holland (1986). pp. 109-142.

16. Agellon, L.B., Chen, T.T., **Van Beneden, R.J**., Sonstegard, R.A., Wagner, G.F., and McKeown, B.A. Rainbow trout (*Salmo gairdneri*) growth hormone: *In vitro* translation of pituitary RNA and product analysis. *Canadian Journal of Fisheries and Aquatic Sciences 43*: 1327-1331, 1986.

17. Chen, T.T., **Van Beneden, R.J**., Agellon, L.B., and Sonstegard, R.A. Molecular toxicology: A new frontier. In: Proceedings of the Pacific Congress on Marine Technology. Hawaii, MRM 12, pp.3-4, 1986.

18. Powers, D.A., Agellon, L.B., Chen, T.T., **Van Beneden, R.J**., Smith, M., Frazier, J., and DiMichele, L. Genetic engineering of fish. In: Proceedings of the Pacific Congress on Marine Technology. Hawaii, MRM 12-10, pp.10-15, 1986.

19. Chen, T.T., Agellon, L.B. and **Van Beneden, R.J**. Genetic engineering of fish. In: Tiews, Klaus (ed.), The Symposium on Selection, Hybridization, and Genetic Engineering in Aquaculture of Fish and Shellfish for Consumption and Stocking. Bordeaux, France EIFAC/86/ SYMP E71, Berlin, FRG, pp.347-360, 1987.

20. **Van Beneden, R.J**., Watson, D.K., Chen, T.T., Lautenberger, J.A. and Papas, T.S. Teleost oncogenes. Evolutionary comparison to other vertebrate oncogenes and possible roles in teleost neoplasms. *Marine Environmental Research 24*: 339-343, 1988.

21. **Van Beneden, R.J**. and Powers, D.A. Structural and functional differences of two clinally distributed glucosephosphate isomerase allelic isozymes from the teleost *Fundulus heteroclitus*. *Journal of Molecular Biology and Evolution 6*: 155-170, 1989.

22. **Van Beneden, R.J**., Henderson, K.W., Blair, D.G., Papas, T.S. and Gardner, H.S. Oncogenes in hematopoetic and hepatic fish neoplasms. *Cancer Research 50*: 5671-5674, 1990.

23. **Van Beneden, R.J**., Blair, D.G., Blake, N.J. and Gardner, G.R. Implications for the presence of transforming genes in gonadal tumors in two bivalve mollusk species. *Cancer Research 53*: 2976-2979, 1993.

24. **Van Beneden, R.J.,** Henderson, K.W., Gardner, H.S., Blair, D.G., and Papas, T.S. New models for oncogene isolation in the study of carcinogenesis. In: *Compendium of the FY1988 & FY1989 Research Reviews for the Research Methods Branch*, U.S. Army Biomedical Research and Development, Ft. Detrick, MD, pg 10-16, 1993.

25. **Van Beneden, R.J**., Henderson, K.W., Roberts, M.A., Gardner, H.S. and Papas, T.S.: Role of oncogenes in chemical carcinogenesis. In: *Compendium of the FY1988 & FY1989 Research Reviews for the Research Methods Branch*, U.S. Army Biomedical Research and Development, Ft. Detrick, MD, pg 97-102, 1993.

26. **Van Beneden, R.J**. and Ostrander, G.K. Expression of Oncogenes and Suppressor Genes in Teleost Fishes, In: Molecular Biological and Biochemical Approaches to Aquatic Toxicology,

Editors, D. C. Malins and G.K. Ostrander, CRC Press, Inc., Boca Raton, FL, pp 295-325, 1994.

27. **Van Beneden, R.J**., Ashley, K.D. and Gardner, H.S Molecular Analysis of Medaka Tumors: New Models for Carcinogenicity Testing, In: Proceedings of Non-mammalian Toxicity Assessment Research Review, U.S. Army Biomedical Research and Development, pg.101-112, 1994.

28. **Van Beneden, R.J**.: Oncogenes. In: Biochemistry and Molecular Biology of Fishes, Volume 2, Editors P.W. Hochachka and T.P. Mommsen, Elsevier Press, 1993.

29. **Van Beneden, R. J.** Molecular Analysis of Bivalve Tumors: Models for environmental/genetic interactions. *Environmental Health Perspectives 102:* 81-83, 1994.

30. Winn, R.N., **Van Beneden, R.J**. and Burkhart, J.G. Transfer, methylation and spontaneous mutation frequency of Phi-X 174*am3cs70* sequences in medaka (*Oryzias latipes*) and mummichog (*Fundulus heteroclitus*): Implications for gene transfer and environmental mutagenesis in aquatic species. *Marine Environmental Research 40*: 247-265, 1995.

31. Brown, D.J., **Van Beneden, R.J**. and Clark, G.C. Identification of Two Binding Proteins for Halogenated Aromatic Hydrocarbons in the Hard-shelled Clam, *Mercenaria mercenaria. Archives Biochem. Biophys*. *319*: 217-224, 1995.

32. **Van Beneden, R.J**. Comparative studies of molecular mechanisms of tumorigenesis in herbicide-exposed bivalves. In: Interconnections between Human and Ecosystem Health. (eds. DiGiulio, R. and Monosson, E.) Chapman and Hall Ecotoxicology Series, London, England, pg 29-43, 1996.

33. Rhodes, L.D. and **Van Beneden, R.J**. Application of differential display polymerase chain reaction to the study of neoplasms of feral marine bivalves. *Marine Environ. Res. 42*: 81-85, 1996.

34. Brown, D.J., Gardner, G.R., Clark, G.C. and **Van Beneden, R.J**. Identification of dioxin-specific binding proteins in marine bivalves. *Marine Environ. Res*. *42*: 7-11, 1996.

35. Carter, C., Ellington, W. and **Van Beneden, R.J**. Confocal laser scanning microscopy of oncogene localization in rainbow trout cell lines derived from normal and tumor tissue. *Toxicologic Pathology 24:* 339-345, 1996.

36. Rhodes, L.D. and **Van Beneden, R.J.** Gene expression analysis in aquatic animals using differential display polymerase chain reaction. In: Techniques in Aquatic Toxicology (ed. G.K. Ostrander) Lewis Publishers, CRC Press, Boca Raton, FL, pp 161-183, 1996.

37. Caporale, D.A., Beal, B.F., Roxby, R. and **Van Beneden, R.J.** Population structure of *Mya arenaria* along the New England coastline. *Molecular Marine Biology and Biotechnology 6*: 33-39, 1997.

38. Brown, D.J., Clark, G.C., and **Van Beneden, R.J.** Halogenated aromatic hydrocarbon-binding proteins identified in several invertebrate marine species. *Aquatic Toxicology 37:* 71-78, 1997.

39. **Van Beneden, R.J.** Environmental Effects and Aquatic Organisms: Investigations of molecular mechanisms of carcinogenesis. *Environmental Health Perspectives 105:* 669-674, 1997.

40. Krause, M.K., Rhodes, L.R. and **Van Beneden, R.J**. Cloning of medaka *p53* and evaluation of mutational hotspots in MNNG-exposed fish. *Gene 189:* 101-106, 1997.

41. **Van Beneden, R.J**., Walker, C.W. and Laughner, E.S. Characterization of gene expression of *p53* homolog in the soft-shell clam, *Mya arenaria. Molecular Marine Biology and Biotechnology* 6: 116-122, 1997.

42. **Van Beneden, R.J**. Activated oncogenes in fish and molluscan neoplasms. In: Spontaneous Animal Tumors: A survey. Eds. L. Rossi, R. Richardson and J. Harshbarger. Proceedings of the first world conference on spontaneous animal tumors in Genoa, Italy, (April 28-30, 1995), 1997, pp 65-71.

43. Rhodes, L.D., Gardner, G.R. and **Van Beneden, R.J**. Short-term tissue distribution, depuration, and possible gene expression effects of [^{3}H]TCDD exposure in soft-shell clams (*Mya arenaria*). *Environmental Toxicology and Chemistry 16:* 1888-1894, 1997.

44. Rhodes, L.D. and Van Beneden, R.J. Isolation of cDNA and characterization of expression of ribosomal protein S19 from the soft-shell clam, *Mya arenaria*. *Gene 197:* 295-304, 1997.

45. **Van Beneden, R.J**., Rhodes, L.D. and Gardner, G.R. Studies of the Molecular Basis of Gonadal Tumors in the Marine Bivalve, *Mya arenaria. Marine Environmental Research* 46: 209-213, 1998.

46. Brown, D.J., Clark, G.C. and **Van Beneden, R.J**. A Novel Cytochrome P450 from the clam, *Mercenaria mercenaria. Comparative Biochemistry and Physiology, Part C 121:* 351-360, 1998.

47. **Van Beneden, R.J**., Rhodes., L.D. and Gardner, G.R. Potential Alterations in Gene Expression Associated with Carcinogen Exposure in *Mya arenaria*. *Biomarkers 4:* 485-491, 1999.

48. Kelley, M.L. and **Van Beneden, R.J**. Identification of an E3 Ubiquitin-Protein Ligase in the Softshell Clam (*Mya arenaria*). *Marine Environmental Research 50*: 289-293, 2000.

49.Kelley, M.L., Winge, P., Heaney, J.D., Stephens, Farrell, J.H., **Van Beneden, R.J**., Reinsich, C.L., Lesser, M.P. and Walker, C.W. Expression of homologues for p53 and p73 in the softshell clam (*Mya arenaria*), a Naturally-Occurring Model for Human Leukemia. *Oncogene 20*: 289-293, 2001.

50. Rotchell, J.M., Ungal, E., **Van Beneden, R.J**. and Ostrander, G.K. Retinoblastoma gene mutations in chemically-induced liver tumors from the Japanese medaka (*Oryzias latipes*). *Marine Biotechnology 3*: S44-49, 2001.

51. Butler, R.A., Kelley, M.L., Powell, W., Hahn, M.E. and **Van Beneden, R.J.** An aryl hydrocarbon receptor (AHR) homologue from the soft-shell clam, *Mya arenaria:* evidence that invertebrate

homologues lack 2,3,7,8-tetrachlorodibenzo-*p*-dioxin and ß-naphthoflavone binding. *Gene* 278: 223-234, 2001.

52. Butler, R.A., Kelley, M.L., Olberding, K.E., Gardner, G.R., and **Van Beneden, R.J**. The Aryl Hydrocarbon Receptor (AHR)-Independent Effects of 2,3,7,8-tetrachlorodibenzo-*p*-dioxin (TCDD) on Softshell Clam (*Mya arenaria*) Reproductive Tissue, *Comp. Biochem. Physiol. 138:*375-381, 2004.

53. Olberding, K.E., Kelley, M.L., Butler, R.A. and **Van Beneden, R.J.** A HECT E3 ubiquitin-protein ligase with sequence similarity to E6AP does not target p53 for degradation in the softshell clam (*Mya arenaria*), *Mutation Research 552:* 61-71, 2004.

54. **Van Beneden, R.J.** Molecular Pathology of Contaminant-Associated Neoplasia in Bivalves. Proceedings of the American College of Veterinary Pathologists/American Society for Veterinary Clinical Pathology Annual Meetings. Boston, MA, December 7, 2005.

55. Elskus, A.A., LeBlanc, L.A., Kim, C., **Van Beneden, R.**, and Mayer, G. Studying toxicity: The effects of dam removal. *International Water Power and Dam Construction,* pp 30-32, 2006.

56. Holbrook, L.A.C., Butler, R.A., Cashon, R.E. and **Van Beneden, R.J**. Soft-shell clam (*Mya arenaria*) p53: A Structural and Functional Comparison to Human p53. *Gene* 433: 81-87, 2009. Holbrook, L.A.C., Butler, R.A., Cashon, RE and Van Beneden, RJ. Soft-shell clam (*Mya arenaria*) p53: A Structural and Functional Comparison to Human p53. *Gene* 433: 81-87, 2009.

57. Lindsay, S, Chasse, J, Butler, RA, Morrill, W and **Van Beneden, RJ**. Impacts of stage-specific acute pesticide exposure on predicted population structure of the soft-shell clam, *Mya arenaria. Aquatic Toxicology* 98: 265–274, 2010.

58. Muttray, AF, O'Toole, TF, Morrill, **Van Beneden, RJ**, Baldwin, SA. An invertebrate *mdm2* homolog interacts with p53 and is differentially expressed together with *p53* and *ras* in neoplastic *M. trossulus* haemocytes. *Comp. Biochem. Physiol*. Part B 156: 298-308, 2010.

59. Mower, BF, Munkittrick, KR, McMaster, ME and **Van Beneden, RJ**. Response of white sucker (*Catostomus commersoni*) to pulp and paper mill effluent in the Androscoggin River, ME, USA. *Environmental Toxicology and Chemistry* 30:142–153, 2011.

60. Walker, CW, **Van Beneden, RJ,** Muttray, AF, Böttger, SA, Kelley, ML, Tucker, AE, and Kelley Thomas, WK. p53 Superfamily proteins In: Bivalve Cancer and Stress Biology. 2011

61. Liu Y, Hock JM, **Van Beneden RJ**, Li X. Aberrant overexpression of FOXM1 transcription factor plays a critical role in lung carcinogenesis induced by low doses of arsenic. *Molecular Carcinogenesis* 53(5):380-91, 2014.

62. Carlson, P., Smalley, D., **Van Beneden, RJ.** Proteomic analysis of arsenic-exposed zebrafish (*Danio rerio*) identifies altered expression in proteins involved in fibrosis and lipid uptake in a gender-specific manner. *Toxicological Sciences* 134: 83-91, 2013

63. Carlson, P. and **Van Beneden, RJ**. Arsenic exposure alters expression of cell cycle and lipid metabolism genes in the liver of adult zebrafish (*Danio rerio*). *Aquatic Toxicology* 153: 66-72, 2014.

64. Carlson, P, Lichtenwalner, A, Grumbach, LL**, Van Beneden, RJ.** Transplacental exposure to arsenic induces sex-specific changes and transgenerational effects in cell cycle regulatory genes in C57BL/6 mice. *Archives of Toxicology, in revision*

65. Udawatte, DJ, Lichtenwalner, A and **Van Beneden, RJ**. Low-Dose transplacental arsenic exposure alters Cell Cycle Gene Expression in Mouse Lungs. *In prep.*

Research Support

MAFES (Maine Agriculture & Forestry Experiment Station) ME08509, 10/01/04-09/30/14
Contaminant Effects on Early Life Stages of Shellfish and Finfish
The goal of this study is to characterize cellular, reproductive, biochemical changes in fish and shellfish exposed to anthropogenic contaminants.
Role: PI

DEP (Maine Dept. of Environmental Protection) contract, 2015-2016. Assessing Resistance to Mercury Toxicity in Mummichog from the Lower Penobscot River.
Role: Co-PI (with A. Elskus)

Graduate Advising History

I am currently advising two masters degree students (Biochemistry and Marine Science). Since coming to UMaine 23 years ago, I have graduated 11 Ph.D. and MS students in Biochemistry, Biology or Marine Science.