CURRICULUM VITAE

R. BARRY HOLTZ, Ph.D

DATE OF BIRTH: August 31, 1946

EDUCATION:

Westminster College
New Wilmington, PA
B.S. in Biology, 1968

Pennsylvania State University
University Park, PA
Ph.D. in Biochemisty/Food Science, 1972

Scripps Institution of Oceanography
La Jolla, CA
Post Doctoral Research Biochemist, 1974

PROFESSIONAL HISTORY AND ACADEMIC POSITIONS:

2014 –Present
Principal
Holtz Biopharma Consulting

Feb. 2016 – April 2019
President
iBio, CMO LLC (Caliber Biotherapeutics acquired by iBio (2016)

Senior Vice President, Biopharmaceutical Product Development
iBio, Inc.

2015 – Present
Board Member of the Alert Bay Marine Research Society

2009 - 2014

Founder and Chief Technology Officer
G-CON, LLC
College Station, Texas

Founder and Chief Science and Technology Officer
Caliber Biotherapeutics
College Station, Texas

2004 -2014	Founder President/CEO InterveXion Therapeutics, LLC Little Rock, Arkansas
2000 – Feb. 2004	Senior Vice President, Biopharmaceutical Development Large Scale Biology Corporation Vacaville, California
1995 – 2000	Senior Vice President, Bioprocess Development and Biopharmaceutical Manufacturing Large Scale Biology Corporation (Formerly Biosource Technologies), Vacaville, California
1989 – 1995	Vice President Bioengineering Biosource Technologies, Vacaville, California (Holtz Bioengineering acquired by Biosource January, 1989)
1980-1989	President and Director of Research Holtz Bio-Engineering, Inc. Morgan Hill, California
1973-1980	Founder and Director, Research and Engineering MFI, Inc. San Jose, California
1975-1979	Group Leader, Fundamental Research and Group Leader, Environmental Research Foremost Foods Company/ Foremost McKesson Group Dublin, California
1974-1975	Assistant Professor Department of Food Science and Nutrition Ohio State University Columbus, Ohio
1972-1974	NSF Post-Doctoral Research Biochemist Scripps Institution of Oceanography La Jolla, California
1968-1972	National Science Foundation Fellow and Graduate Research Assistant Pennsylvania State University

ACADEMIC HONORS AND AWARDS:

Honor Student, Westminster College, 1967-68
Sigma Xi Award for Excellence in Undergraduate Research, 1968
NSF Graduate Fellowship, Pennsylvania State University, 1968-72
NSF Post-Doctoral Research Fellowship, 1972-1974
Gamma Sigma Delta, Agricultural Honorary
Sigma Xi, Science Honorary

Beta Beta Beta, Biological Honorary
The Pennsylvania State University,Award for Outstanding Research, 1972
The Pennsylvania State University Outstanding Alumnus Award 2003
The Armsby Honor Society, Pennsylvania State University, 2004
Honorary Chair of Biotherapeutics
Swansea University, Swansea Wales 2013

PROFESSIONAL ORGANIZATIONS:

AAAS
Parenteral Drug Association
International Society of Pharmaceutical Engineering

JOB RESPONSIBILITIES:

Holtz Biopharma Consulting

Principal – is responsible for development and execution of consulting projects and collaborations. Recent projects have been focused in several areas including , patient specific medicine (cancer therapies), metabolic diseases, and global scale vaccine and bio-therapeutics development for emerging countries. The firm and its industry collaborators have recently assisted in the design, construction, validation, and development of quality plans for two patient specific cancer therapy manufacturing facilities. Recently, Dr. Holtz has lead design teams for the development of biopharma manfacturing facilities in South Africa, China and Israel. Holtz Biopharma Consulting serves a number of clients in process development, facility design and regulatory issues.

iBio, Inc. and iBio CDMO

President iBio CDMO- was responsible for the operation of the facility in Bryan, Texas. The facility is tasked to make biopharmaceuticals for commercial customers under full cGMP compliance.

Senior Vice President of Biopharmaceutical Product Development – was responsible for the process development and production of clinical materials for iBio's proprietary products.

Caliber Biotherapeutics, LLC.

Founder, President and CSO- was responsible for the design, construction, commissioning and process validation of a cGMP compliant facility that had the capability of producing 300 kg/yr of monclonal antibodies. The facility was also capable of producing over 300 million doses of various vaccine targets per year. The 130,000 square foot, 5 story structure in Bryan/College Station Texas was orginally constructed in partnership with DARPA to provide rapid response against biothreats to the United States. The Caliber Biotherapeutics facility which won the technology innovation award at Interphex in 2015.

G-CON, LLC.

Founder and Chief Science and Technology Officer. - responsible for the corporate management of the company. The company has several divisions. Calilber Biotherapeutics was a manufacturer of vaccines using plants as bioreactors. G-CON Manufacturing builds modular, self-contained clean rooms and

provides design services for biopharmaceutical manfacturing companies. Dr. Holtz designed and led the PCMM project with Pfizer won the ISPE facility of the year award in 2015. PCMM was a modular, completely automated,oral solid dosage facility with a capacity of 500 M doses per year. Dr. Holtz also led the design/build of the Caliber Biotherapeutics facility which won the technology innovation award at Interphex in 2015.

Intervexion Therapeutics

President/ CEO- responsible for the corporate management of a biopharmaceutical development company that uses proprietary hapten technology to develop monoclonal antibodies for binding small organic molecules. The company is focused on medications for the substance abuse market. Antibodies are being developed for binding phencyclidine and methamphetamine. The company has inititated clinical trials.

Large Scale Biology Corporation

Senior Vice President, Biopharmaceutical Development – was responsible for the product development of all proprietary biopharmaceutical products. Responisibilties included product development, clinical development, IND management and business development of five major internal drug candidates. Dr. Holtz was responsible for coordinating clinical sites, CRO's, and regulatory consultants and was the primary company fiduciary with regulatory agencies including the FDA and USDA/APHIS. Dr. Holtz was also a key member of the product development effort and was charged with scientific, business and market analyses of new target therapies and opportunities for the company.

Dr. Holtz managed a group of over 50 scientists and manufacturing personnel and had two vice presidents of the company as direct reports. The company, during this period, completed a successful IPO valued at $100M. Dr. Holtz was a member of the executive committee and was involved with senior management in the transition of the company from a private entity to a publically held company.

Dr. Holtz was the program director for the development, manufacturing and human clinical testing of a patient specific vaccine for Non-Hodgkin's B-cell lymphoma. This was a collaborative project with Dr. Ron Levy at the Stanford University Medical Center, Department of Oncology. This product was in clinical trials and had advanced to a the beginning of a Phase III clinical trial after a successful clinical and CMC review by FDA in a pre-Phase III meeting.

Dr. Holtz was also the program director for the development of therapeutic alpha-galactosidase A, an enzyme replacement therapy. This drug was granted and orphan drug designation by FDA and a successful pre-IND meeting was completed. A CRADA with NIH-NINDS and Dr. Roscoe Brady has resulted in the successful pre-clinical evaluation of the drug produced in the Kentucky facility.

Senior Vice President-Bioprocess Development – was responsible for all bioprocess development of products including biopolymers, pharmaceuticals and other complex biomolecules. Included in this responsibility is the successful scale-up of a fermentation process using recombinant DNA to produce melanin biopolymers for topical pharmaceutical use. the design and construction of a GMP-biopharmaceutical for the production of melanin, including the design of the facilities, control systems, bioreactors and downstream processing equipment for Rorer-Rhone Poulenc.

Dr. Holtz was responsible for the group that completed bioprocess development of the Geneware process for extraction and purification of recombinantly produced biomolecules from plants.

Dr. Holtz was also responsible for leading the design team and the construction and validation of the LSBC's 75,000 sq. ft. biopharmaceutical production facility for producing parenteral therapeutics from plants. This is the first facility of its kind ever built and has the capability of producing patient specific vaccines for B cell lymphoma. The large scale extraction capabilities of this facility can process 3000 kg of plant biomass per hour.

Other major projects included the design and construction of a large biopharmaceutical production plant for a major pharmaceutical partner. A state of the art, natural flavor production facility was also designed, constructed and brought into production in a partnership with RJR-Nabisco.

Holtz Bio-Engineering Inc.

President and Director of Research of a consulting bio-technology research laboratory and engineering group whose projects range from fermentation biochemistry, fermentation process control, cell culture bioreactor development and processs control, Downstream recovery of biopharmaceuticals and other biochemicals. Food process biochemistry and engineering, removal of toxic chemicals from water, and environmental engineering.

Holtz Bio-Engineering also developed and marketed its own products including the Proteus 2000™ series of fermentation controllers and fermentation equipment. Projects have included the process development for the recombinant DNA production of proprietary CHO cell derived proteins that are currently marketed and production of recombinant enzymes and biopolymers by fermentation and downstream purification to a pharmaceutical raw material by physical and biochemical processes including ultrafiltration. Notable projects included automation of the primary pilot plant for EPO clinical production at Amgen in 1986.

MFI Inc.

Founder and Director of Research and Engineering. Was responsible for basic research on the nutrition of edible fungi. Also responsible for all product and process development in the marketing of a delayed release nutrient for mushroom culture reduced to practice from a Pennsylvania State Unversity patent. Designed and constructed one of the largest microencapsulation facilities in the world. Included was development of fluid systems, particle sizing, design and construction of fluid bed dryers. The microencapsulated product sales returned the highest value royalties in the history of Pennsylvania State University.

Foremost McKesson Inc., Foods Company-Group Leader

Group Leader of Fundamental Research and Group Leader, Water Research. Was responsible for the management of basic food research projects including the modification and production of new food proteins using biochemical modification and isolation by reverse osmosis, ultrafiltration and electrodialysis.

As Group leader of Water Research Group was responsible for the Trace Organics Analysis Mass Spectrometry Laboratory and Water Research Engineering Laboratory. This group was later spun off as the McKesson Environmental Division. Was also Technical Manager for the Foremost-McKesson Water division, including Sparkletts and Alhambra bottled water companies. These divisions produced over 50 million gallons of purified water by reverse osmosis-deionization per year. Was responsible for the research and engineering of the Aqua Vend RO system to deionize drinking water and to remove organic compounds on the EPA Priority Pollutant list.

As Group Leader of fundamental research, studies were conducted in to the basic structure of lipase enzymes in casein micelles.

Was also responsible for the research and development efforts of MFI, Inc. whose research and engineering efforts were contracted to Foremost Research Center.

Ohio State University-Assistant Professor

Was responsible for developing and teaching an undergraduate university wide core curriculum course in basic food science and nutrition and conducting competitive grant sponsored research in the areas of marine biochemistry and fungal lipid metabolism. Served as a consultant to the Ralston Purina Co. and Foremost-McKesson Inc.

Scripps Institution of Oceanography-Postdoctoral Fellow-Research Biochemist

Was responsible for conducting independent research in the areas of phytoplankton lipid biochemistry, lipoprotein metabolism of salmonids, analytical biochemistry and electron microscopy of chloroplast membranes. Extensive shipboard studies were conducted.

Pennsylvania State University-Graduate Assistant

Was responsible for directing the activities of the Mass Spectrometry Laboratory in the Department of Food Science, including maintenance, modification, and operation of a GLC-Mass Spectrometer, sample preparation, food and natural products chemistry, and interpretation and publication of spectra.

PATENTS:

Dr. Holtz has been awarded twenty four United States patents in areas of bioprocess development, biosynthesis of small molecules, and biopharmaceutical product and process development.

SELECTED PUBLICATIONS AND INVITED SYMPOSIA:

1. R. Barry Holtz and L.C. Schisler. Lipid Metabolism of Agaricus bisporus (Lange) Sing.: I. Analyses of Mycelial and Sporophore and Mycelial Lipids. Lipids, 6:176 (1971).

2. R. B. Holtz, P. Swenson, M. Abel, and T. A. Walters. A Sebacate Contaminant Appearing in Chloroform. Lipids, 6:523 (1971).

3. R. B. Holtz. Qualitative and Quantitative Analyses of Free Neutral Carbohydrates in Mushroom Tissue by GLC-MS. J. Agr. Food Chem., 19:1272 (1971).

4. R. Barry Holtz and Lee C. Schisler. Lipid Metabolism of Agaricus bisporus (Lange) Sing.: II. Biosynthesis of Sporophore Lipids. Lipids, 7:251 (1972).

5. R. B. Holtz, P. S. Stewart, S. Patton, and L. C. Schisler. Isolation and Characterization of Plasma Membranes from the Cultivated Mushroom. J. Plant Physiol., 50.541 (1972).

6. R. Barry Holtz, E. D. Marquez, and A. A. Benson. Wax Ester Biosynthesis by Isolated Membrane Fractions from Calanoid Copepods. Comp. Bioch. Physiol., 45B:585 (1973).

7. R. Barry Holtz and C. F. Phleger. The Membranous Lining of the Swimbladders of Deep Sea Fishes.: I. Morphology and Chemical Composition. Comp. Bioch. Physiol., 45B:867 (1973).

8. R. Douce, R. B. Holtz, and A. A. Benson. Isolation and Properties of the Envelope of Spinach Chloroplasts. J. Biol. Chem., 248:7215 (1973).

9. R. V. Josephson, R. B. Holtz, J. P. Misock, and C. F. Phleger. Composition and Partial Protein Characterizations of Swimbladder Foam from Deep Sea Fishes, Coryphenoides acrolepis and Antimora rostrata. Comp. Bioch. Physiol., 52B:25 (1977).

10. R. B. Holtz and D. E. Smith. Lipid Analyses of Mushroom Compost. The Mushroom Journal, Sept. 1975, pp 13-16.

11. R. B. Holtz, R. F. Lee, and A. A. Benson. Fatty acid compositions of Calanus pacificus and Calanus Hyperboreus. Presented at the American Oil Chemist Society meeting, October, 1974.

12. R. B. Holtz, C. F. Phleger, and P. W. Grimes. Membrane Biosynthesis in Deep Sea Fishes. Comp. Bioch. Physiol., 56B:25 (1977).

13. R. Barry Holtz. Lipids in Fungi, Book Review, Science, 189:629-30 (1975).

14. D. Beggs and R. Barry Holtz, Automated Analysis of Organic Pollutants in Water Via GC-MS. Pittsburg Conference 1978, Cleveland , Ohio.

15. R. B. Holtz and D. E. Smith. Environmental Trace Organic Analysis by GC-MS: Lab Management Considerations. Presented at Pacific Conference on Chemistry and Spectroscopy, Anaheim, CA., 1977.

16. R. Barry Holtz. Quality Assurance for the Modern Instrumental Analysis Facility. Food Product Development, October 1976, p. 90.

17. R. B. Holtz. Assuring Water Quality. Food Product Development, Dec. 1976, p. 70.

18. R. B. Holtz. Some Considerations For Quality Assurance Planning in Product Development. Food Product Development, June 1977.

19. C. F. Phleger, R. B. Holtz, P. W. Grimes, and D. L. Leighton. Chemical and Sensory Analysis of the Purple Hinged Rock Scallop (Himites multirugosus). J. Comp. Bioch. Physiol 57A:342, 1978

20. R. B. Holtz and V. Miroyan. Use of Response Surface Methodology (RSM) for Experimentation in Mushroom Culture.: I. Development of a Delayed Release Nutrient. Mushroom Science, X. Proceedings of the 10th International Congress on Edible Fungi, Bordeaux, France, 1978.

21. R. B. Holtz and D. E. Smith. Lipid Metabolism of Mushroom Mycelia. Mushroom Science, X. Proceedings of the 10th International Congress on Edible Fungi, Bordeaux, France, 1978.

22. R. B. Holtz. Delayed Release Substances. 1st Northern American Mushroom Congress, San Francisco, CA, 1979.

23. R. B. Holtz, N. Markowitz and B. Spruce. Development of an Effective Delayed Release Pesticide for Control of Sciarid Flies. Mushroom Science, XI. Proceedings of the 11th International Congress on Edible Fungi, Sydney, Autstralia, 1981.

24. R. B. Holtz, Bioenergetic Considerations of Composting, 1st Spawn Mate Symposium, Palm Springs, CA, 1981.

25. R. B. Holtz, Increases in Yield, The R & D Perspective. 4th North American Mushroom Conference, Vancouver, Canada, 1983

26. R. B. Holtz, Research in Edible Fungi:Future Directions. 4th Spawn Mate Symposium, Scottsdale, AZ, 1985

27. R. B. Holtz, Cell Energy Metabolism in Agaricus as it relates to osmotic pressure. International Symposium on Edible Fungi, Colloquium Speaker. University Park, PA, 1985.

28. R. B. Holtz, and Lee C. Schisler, Utilization of Fatty Acids by Agaricus Bisporus in commercial Culture, Mycologia, 78(5), 1986 p.722.

29. R. B. Holtz, A System for Computer Process Control of Fermentation, Am. Biotech. Lab. Nov., 1986.

30. R. B. Holtz, Distributed Logic Control Sytems for Fermentation and Downstream Processing. Advances in Instrumentation, Vol. 42, Part 3, 1987.

31. R. B. Holtz and L. Grill, Commercial Production of Melanin with Tyrosinase Using Recombinant DNA Technology. Amercian Society for Microbiology, Conference on Biotechnology, 1990

32. R. B. Holtz and Michael McCulloch, Preparation of Commercial Mushroom Inoculum Using Submerged Culture. Society for Industrial Microbiology, Bioprocess Symposium. 1995.

33. R. B. Holtz. Formation of Savory Flavor Products from Commercial Mushroom Production and Processing. Society for Industrial Microbiology, Bioproducts Symposium. 1995.

34. White, E. L. Reinl, S. J., Holtz, R. B. and Turpen, T. H. 1996. Matrix Assisted Laser Desorption Time of Flight (MALDI-TOF) Mass Spectrometry Analysis of Fusion Proteins Expressed by recombinant Tobacco Mosaic Virus. Connectivity: The Winston-Salem Research & Technology Vision, Winston-Salem, North Carolina.

35. Turpen, T.,Cameron, T.I., Reinl, S. J., Pogue, G. P., Garger, S. J., McCulloch, M. J., Holtz, R. B., Grill, L. K., Production of Recombinant proteins in Plants: Pharmaceutical Applications. The Soc. Exper. Biol., Canterbury, UK *J. Exp Botany* 48(Suppl), 12. 1997.

36. Turpen, T. H., Cameron, T., Reinl, S., Pogue, G. P., Garger, S. J., McCulloch, M. J., Holtz, R. B., and Grill, L. K., 1997 Phytopthology and the production of pharmaceuticals based on recombinant proteins. The American Phytopathology Society, Rochester, New York

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37. G.P. Pogue, S. Garger, M. McCulloch, S. Reinl, B. Holtz, T. Turpen, J. Hildalgo, T. Cameron, L. Kreitzer, C. Gross, K. Hanley, L. K. Grill 1998. From Dirt to Drugs: The Use of Viral Vectors to Make Pharmaceutical Grade Recombinant Proteins, Fifth International Symposium on Positive Strand RNA Viruses.

38. R. Barry Holtz and Steven Garger, Commercialization of Recombinantly Derived Therapeutics from Tobacco Plants in a cGMP facility. Division of Biological Chemistry, American Chemical Society National Meeting, 1999

39. R. Barry Holtz. Purification Systems for Plant Derived Biologics. Invited Paper. Plant Derived Biologics Seminar. Sponsored by FDA/CBER and USDA/APHIS . Ames, Iowa, 2000

40. Gelderman, M. P., Oliver, K. L., Cameron, T.I., Garger, S. J., Holtz, R. B. and Brady, R.O. Humoral and Immune Responses to Alpha-Galactosidase A in the Murine Analog of Fabry Disease, FASEB, Experimental Biology 2001, Orlando, Florida.

41. Holtz, R. B. Vaccine Production Using Plants as Bioreactors : Regulatory Issues and Opportunities. Invited Paper. BIOPHEX. October, 2002, San Jose, California

42. Holtz, R. B. Forging Alliances between the Private Sector, Universities and Government, Key note speech, Arkansas Biosciences Institute. October 2002

43. Holtz, R. B. Rapid Scale-Up of Vaccine Production in Plants: Two Case Studies. Invited Speaker, World Vaccine Conference. Lyon, France. 2002

44. Reddy, S., Czerwinski, D., Rajapaksa, R., Reinl, S., Garger, S., Cameron, T., Barrett, J., Novak, J,. Holtz, R. B., Levy, R. Plant Derived Single-Chain Fv Idiotype Vaccines are Safe and Immunogenic in Patients With Follicular Lymphoma: Results of a Phase I Study. American Society of Hematology, inivited paper, December, 2002.

45. Holtz, R. B. Synchronizing cGMP manufacturing of biopharmaceuticals with clinical requirements. BioLogic, Geneva, 2003

46. Holtz, R. B. Economic assessment of biopharmaceutical processes: Use of modeling tools BioLogic , Boston, 2003

47. Gelderman, M. P., Oliver, K. L., Cameron, T.I., Garger, S. J., Holtz, R. B. and Brady, R.O. Pre-Clinical Studies of a Plant Derived Alpha-Galactosidase for Enzyme Replacement Therapy, Preclinica, January, 2004

48. G. Pogue, T. Cameron, L. Hamm, S. Rienl, A. McCormick, K. Hanley, E. White, R. O. Brady, M. Gelderman, G. Grabowskit, H. Du, L. Grill, D. Tuse, B. Holtz, and S. Garger. Rapid Optimization of Human Therapeutic Glycoprotein Expression Using a Transient Plant Expression system. CPMP Meeting, Montreal, 2005

49. R. B. Holtz, Quality Assurance of Downstream Processes: Considerations for PAT. R. B. Holtz. CPMP Meeting, Montreal, 2005

51. Blueprint for the Development of Plant Derived Vaccines for the Poor in Developing Countries. A Program of the Center for Infectious Diseases and Vaccinology, The BioDesign Institute at Arizona State University, Blue Ribbon Panel, 2005.

52. Plant-Derived Vaccines:Cost of Production. A Program of the Center for Infectious Diseases and Vaccinology, The BioDesign Institute at Arizona State University, Blue Ribbon Panel, 2005.

53. R. B. Holtz. Session Chairman, Case Studies in Alternate Biotech Manufacturing Process Development. PDA Annual Meeting, Anahiem, CA 2006

54. WHO Informal Consultation on Scientific Basis for Regulatory Evaluation of Candidate Human Vaccines from Plants, Geneva, Switzerland, 2005, Vaccine 24:4271-8. 2006

54. R. B. Holtz. Cancer Vaccine Development on the Fast Track: A case study in facilties planning for clinical support and Scale-up" BioLogic Europe, Amsterdam , 2006

55. R. B. Holtz. Session Chairman, Manufacturing and Quality Control section, New Cells for New Vaccines Conference, Internation Association for Biologicals, September, 2006, Miami.

57. R. B. Holtz, Making Real Medicines, Cross Disciplinary Science, Engineering and Management at its Best. Keynote Speech, INBRE Conference, November, 2006

58. R. B. Holtz, Cancer Vaccines: Strategic Planning of Manufacturing Development. Invited speaker. 14th Internation Conference on Gene Therapy, September, 2006, Dallas

59. R. B. Holtz, Multisite Collaborations for the Institutional Sponsor, Invited Speaker, Navigating Through the Sponsor-Investigator IND Minefield Conference, University of Arkansas for Medical Sciences, April, 2007, Little Rock.

60. R. B. Holtz, Validating Vaccine Facilities : Focus on Early Stage Companies and Institutions. Cambridge Healthcare Institute Conference, Immunotherapeutics & Vaccines Summitt. August, 2007,Boston

61. R. B. Holtz, Manufacturing Patient Specific Therapies: Strategic, Regulatory, and Scale-up Issues. Cell and Tissue Bioprocessing Meeting, October, 2007 Austin, TX

62. McCormick, A.A., Reddy, S., Reinl, S.J., Cameron, T.I., Czerwinkski, D.K., Vojdani, F., Hanley, K., Garger, S.J., White,E.L., Novak, J., Barrett, J., Holtz, R.B., Tusé, D., and Levy, R. Plant-produced Idiotype Vaccines for the Treatment of Non-Hodgkin's Lymphoma: Safety and Immunogenicity in a Phase I Clinical Study. PNAS, Vol. 105, 10131 -10136, 2008

63. R. B. Holtz, An Aggressive Facilities and Quality Systems Approach for Developing Biopharmaceutical Manufacturers. Cambridge Healthcare Institute Protein Conference, San Diego CA, January, 200

64. R. Barry Holtz, Phillip B. Maples, Biaoru Li, Courtney Haddock, Eli Gutierrez, Padmsini Kumar, Lori Debetaz, Neil Senzer, JohnNemunaitis. Integration of LC Maldi-TOF/TOF Mass Spectrometry to Provide Proteogenomic Information for the Manufacture of Patient Specific Cancer Therapies. American Society for Gene Therapy, Boston, 2008

65. Senzer, N., Holtz, R. B., Haddock, C., Nemunaitis, J., Individualized Combinatorial Targeting using Transcriptosomic and Proteomic Tumor:normal Tissue Co-Expression Data. American Society for Gene Therapy, invited paper, 2019

66. C. Haddock; N. Senzer; J. Nemunaitis; B. Holtz; P. Maples, Use of Mass Spectrometry to Describe Protein Up-Regulations in Breast Cancer Tumors Employing the Phosphoproteome. American Society for Gene Therapy, invited paper, 2010

67. R. B. Holtz, Flexible Facilities and Single-Use Systems for the Production of Vaccines and Monoclonal Antibodies, IS Biotech, invited paper, Washington D. C. 2013

68. R. B. Holtz, Developing Predictive Tools as Part of QbD: Rapid Scale-up of Pharma Manufacturing. IS Biotech, invited paper, Washington, D. C. 2013

69. Earl L. White, Lindsay D. Bennett, Brian R. Berquist, Iqbal Grewal, Sanjay Khare, Vally Kommineni, Sylvain Marcel, Ryan P. Murray, Ranjith Munigunti, Shawn Nie, Raj Sachdev, Don Wilkerson, Isaac Wong and R. Barry Holtz. Expresssion and Characterization of a Trastuzumab-Interferon Fusion Protein in *Nicotiana Benthaminana*. American Society for Mass Spectrometry, annual meeting, 2013

70. Lindsay D. Bennett, Sreeram Reddy, Ryan P. Murray, Ranjith Munigunti, Brian R. Berquist, Sylvain Marcel, Urban Ramstedt, Michael Callahan and Earl White. Rapid Plant- Made Pharmaceutical Platform for Anti-Viral Monoclonal Antibodies. Pep Talk, San Diego, 2104

71. R. Barry Holtz, Brian R. Berquist, Lindsay D. Bennett, Vally J. M. Kommineni, Ranjith K. Munigunti, Earl L. White, Don C. Wilkerson, Kah-Yat I. Wong, Lan H. Ly and Sylvain Marcel.

Commercial-scale Biotherapeutics Manufacturing Facility for Plant-Made Pharmaceuticals. Plant Biotechnology Journal. (2015) 113, pp 1180-1190.

72. Nandi, S., Kwong, A,.Holtz, R. B., Erwin, R.L.Marcel, S., Karen, McDonald. Techno-economic analysis of a transient plant-based platform for monoclonal antibody production. mAbs. 8:8,1456-66. 2016

73. Kommineni, V., Markert, M., Ren, Zhongjie, Palle, S., Carrillo, B. Deng, J., Tejeda, A., Nandi, S., McDonald, K., Marcel, S., Holtz, R. B. In vivo Glycan Engineering via the Mannosidase I inhibitor (Kifunensine) Improve the Efficacy of Rituximab Manufactured in *Nicotiana bethaminana* Int. J. Molecular Sciences, 2018, 19, 194.

OTHER

Dr. Holtz serves on the business advisory board to the Arkansas Biosciences Institute.

Dr. Holtz has served on the Board of Directors of the Owensboro, KY Chamber of Commerce and has served on two of the Kentucky Governor's advisory committees on high-technlogy economic development and development of the rural economy. He has also served on the National Institutes of Health, National Institute on Drug Abuse, Medications Development Scientific Workgroup.

Dr. Holtz has been asked to participate in two briefings on the rapid production of medical countermeasures to President Obama's staff and committee on medical countermeasures at the White House Situation Room. Dr. Holtz is on the NASA CUBES scientific advisory board, a group designing systems for sustainable food and medication supplies for long term deployment to Mars.

Dr. Holtz serves on the Board of Directors of the Alert Bay Marine Society (Alert Bay Marine Laboratory, Alert Bay, British Columbia, Canada)

Hobbies and Interests

Guitar, recording engineering, cycling