



JOY A. CAVAGNARO, Ph.D., DABT, RAC

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Education

1979 Ph.D. (Biochemistry)
University of North Carolina
Chapel Hill, NC

1975 B.S. (Biology)
University of Miami
Coral Gables, Florida

Academic Positions and Research Experience

1976 – 1978 Teaching Assistant
University of North Carolina / School of Medicine
Chapel Hill, NC

1979 – 1980 National Toxicology Fellow
Duke University / School of Medicine
Durham, NC

1981 – 1982 Research Associate, Division of Pediatric Hematology-Oncology
Boston University / School of Medicine
Boston, MA

1982 – 1983 Research Assistant Professor, Division of Pediatric Hematology-Oncology
Boston University / School of Medicine
Boston, MA

**During tenure in Boston University, developed a patented system for primary in vitro immunization of human peripheral blood lymphocytes and their subsequent fusion to produce human-derived monoclonal antibodies.*

Credentials/ Certifications

1997 Appointed to Department of Health and Human Services Senior Biomedical Research Service

1986 Diplomate American Board of Toxicology (current certification)

1999 Regulatory Affairs Certificate (current certification)

2003 NIH Human Participants Protection Education for Research Team

2006 CITI Course in the Protection of Human Research Subjects

Patents

U.S. Patent 696,546

‘Process for Producing Human Antibodies’

Current Role

1999 – Present Access BIO, L.C.
Boyce, VA
President and Founder

Consultancy specializing in science-based regulatory strategies and development services to facilitate biomedical research, emerging technologies and product development, including vaccines, cellular and gene therapies, animal-based and plant-based bio-therapeutics, biotechnology-derived and tissue engineered products. Specific areas of focus include due diligence assessments of preclinical data and preclinical development strategies to support First in Human dose for small molecules and biopharmaceuticals.

Prior Experience

1997 – 1999 Human Genome Sciences, Inc.
Rockville, MD
***Vice President,
Regulatory Affairs and Integrated Compliance***

Established the Regulatory Affairs Department, which included regulatory affairs and clinical data management data programming functions and assisted in identifying and developing new pre-clinical opportunities. Served as company spokesperson with the FDA and foreign agencies in all aspects of the regulatory process. Provided regulatory oversight for the pilot manufacturing facility start-up and commissioning, validation and expansion initiatives. Additional responsibilities included management of an Integrated Compliance Program, a unit formed in 1998, comprised of Quality Assurance (QA), Environmental Health & Safety (EH&S) function and the cross-functional Quality Systems Team (QST.) Provided oversight for development of the HGS EH&S Master Health and Safety Plan which was designed to enhance the management of corporate compliance activities.

1989 - 1997 Food & Drug Administration
Center for Biologics Evaluation and Research (CBER)
Bethesda, MD
***1996 – 1997
Senior Pharmacologist & Director of Quality Assurance
Office of the Center Director***

Responsible for inter-center and inter-national policy guidance for the preclinical development and safety assessment of biological projects. Spokesperson for CBER at local, and national and international meetings related to pharm/tox aspects of biologic product review. From 1990-1997 served as FDA safety topic lead for the International Conference on Harmonization of Technical requirements for Pharmaceuticals (ICH) initiative and as rapporteur for the ICH S6 guidance on preclinical safety evaluation of biotechnology-derived pharmaceuticals.

Monitored quality and consistency of CBER review activities and provided oversight for CBER technical committees created to support review activities. Ensured the accuracy of review and tracking of application data collected and reported by CBER. Chaired and Clinical Hold and Refuse to File Oversight Committees and served as Product Jurisdiction Liaison and center Ombudsman for resolution of review activity disputes unresolved at the division or office level between individuals or entities inside and outside of CBER. Additional responsibilities included supervising the regulatory information management system (RIMS) staff and the project manager of electronic submissions. Served as a member of the Intercenter Prescription Drug User Fee Application (PDUFA) Reauthorization Team In 1997 chaired the FDA Science Symposium. Served as CBER representative to the Interagency Coordinating Committee on the Validation of Alternative Methods (ICCVAM) and chaired the Immunotoxicity Working Group.

March 2009

1995 – 1996 **Senior Pharmacologist and Assistant to the Deputy Director**
Office of the Center Director

Served as ex officio center representative to the National Center for Toxicological Research Scientific Advisory Board. (1993-1997) Assisted in planning and developing policy and programs that set standards for traditional biologicals and biotechnology products. Served as a member on the Review Management Coordinating Committee. Chaired working group to develop guidance for comparability programs for biological products (April, 1996 Guidance Document on Comparability), Chaired the Clinical Hold and Refuse to File Oversight Committees.

1993 – 1995 **Assistant Director for Pharmacology/ Toxicology**
Office of Therapeutics Research and Review

Developed pharmacology/toxicology policy and implemented guiding principles for CBER product application review and surveillance. Ensured interdivisional and interoffice consistency regarding design and analysis of pre-clinical studies. Co-chaired the Intercenter committee on the Use of Transgenic Animals to Produce Therapeutics for Human Use. From 1993-1996, served as CBER representative to the FDA Regulatory Scientist Peer Review Committee and the FDA Chemical Selection Working Group.

1989 - 1992 **Special Assistant to the Director**
Office of Biologics Research

Managed OBRR interface with intramural and extramural pharmacology/toxicology programs and issues. Provided leadership in addressing pharmacology/toxicology issues to the five research division staffs of OBR as well as other offices within CBER. Served as toxicology reviewer on hundreds of INDs and six product license application (PLA) committees. FDA representative to Office Technology Assessment Report on Identifying and Controlling Immunotoxic Substances and member of the Naval Research Advisory Committee Panel on Delivery of Artificial Blood to the Military.

1983 – 1989 Covance (formerly Hazleton Laboratories America, Inc.)
Vienna, VA

1985 - 1989 **Senior Staff Scientist**
Department of Toxicology

Principal study director for pharmaceutical products derived from biotechnology. Developed, implemented, directed, and ensured scientific quality of pre-clinical pharmacology and toxicology studies. Planned, executed, and carried out the program for the safety evaluation of biotechnology-derived products in cooperation with appropriate scientific specialists at the various Hazleton laboratories worldwide. Served as the primary contact for developing pre-clinical development testing strategies including protocol design, standards of technical performance, methods for data interpretation, and recommendations for future directions of the corporation. Managed costs for assigned studies. Also served as the primary contact for inquiries related to immunotoxicology for Hazleton Corporation worldwide. Authored more than 100 confidential study reports.

1984 - 1985 **Manager**
Genetic and Immunotoxicology Laboratories

As principal investigator for all genetic toxicology studies, directed programs to evaluate chemicals, particulate, drugs and biologics in a series of assays designed to determine potential, mutagenic or carcinogenic risks. Studies included in vitro and in vivo assays utilizing bacterial or mammalian cells or rodents to detect gene mutations, DNA damage and repair, and chromosomal aberrations. Managed all costs

and revenues for the laboratories under supervision. Interfaced with the FDA, EPA and other regulatory agencies to assist clients in meeting regulatory requirements. Chaired, Hazleton R&D committee.

1983 – 1984

Staff Scientist

Hybridoma Technology Services, Immunobiology Division

Established an in vitro immunization capability as part of a comprehensive monoclonal antibody production contract service. Initiated research and development efforts for an Immunotoxicology Program. Member of Hazleton Laboratories Corporation Research and Development Committee.

Selected Presentations

Program Chair “Designing Preclinical Safety Evaluation Programs for Novel Therapies: What is the Question?” Preclinical Drug Development Improving Efficiency and Prediction to Proof of Concept, Barnett International, November 28-29, 2001, Philadelphia, PA.

“Regulatory oversight of gene transfer and GLP compliance: good science, good sense and the three R’s of preclinical testing,” Preclinical development of gene therapy vectors: from petri dish to Patient. – Comprehensive Reviewer Course on Clinical Gene Transfer ASGT’s 5th Annual Meeting, June 4, 2002, Boston, MA.

“The way toxicity evaluation of bio-pharmaceutical products should be conducted: ICH S6 guideline”, The role of toxicology in accelerating drug development and improving safety evaluation. - 29th Annual Meeting of the Japanese Society of Toxicology, June 20, 2002, Nagoya, Japan.

Program Co-chair: DIA Worldwide Preclinical Development of Biotechnology-Derived Products: The Science and the Regulation, Oct 21-22, 2002, Bethesda, MD.

“Nonclinical Safety Assessment of Biotechnology-derived Medicinal Products,” What you Need to Know about Optimal Transition from Animal to Man, DIA, Dec 4-5, 2002, Helsingor, Denmark.

Program Co-chair: “Discussion Forum: Development and Regulation of Cell-Based Therapies”, RAPS, March 20-21, 2003, London, UK.

“Putting in all Together- Writing the Label,” Nonclinical Toxicology in Support of Licensure of Gene Therapies, ASGT, March 13-14, 2003, Arlington, VA.

Invited Speaker Korean FDA: “Preclinical Safety Assessment of Cell Therapy and Related Products,” International Symposium on the Current Status of Gene and Cell Therapy, September 2-3, 2003, Seoul, Korea

“Developing Immunotoxicology Guidelines for (Bio) Pharmaceuticals: What is the Question?” Immunotoxicology, Pharmaceutical Educations Associates, September 17, 2003, Rockville, MD

“The State of Vector Biodistribution: How we got here and what we have learned,” 7th Annual ASGT Meeting, June 2, 2004, Minneapolis, MN.

“Product Comparability: From a “Regulatory Viewpoint”, 10th Annual Bio International Conference, June 7, 2004, San Francisco, CA.

Keynote Speaker: “From Bench to Bedside: How Scientist Move Novel Technologies for Test Tubes to Therapies”, Junior Science and Humanities Symposium Greater Washington Metropolitan Area 2005, January 6, 2005, Georgetown University, DC.

Moderator Breakout Session –Pharmacology and Toxicology Studies, FDA/DIA Workshop on Follow-on Protein Products, February 14-16, 2005, Arlington, VA.

March 2009

Scientific Advisory Board and Meeting Chairperson – “Do animal models of disease predict human risk better than normal volunteers” Integrative Preclinical Development for In Vivo and In Vitro Validation. Molecular Medicine Tri-Conference, April 10-12, 2005, San Francisco, CA.

Key Opinion Leaders Meeting for Adenovirus, GlaxoSmithKline, May 19-20, 2005, London, UK

“Optimizing Design and Analysis of Preclinical Development Programs,” 8th Annual Meeting American Society of Gene Therapy, June 2, 2005, St. Louis, MO.

“Preclinical Perspectives Gene/Cellular Therapy and Tissue Engineered Products” 2005 RAPS Annual Conference, October 19, 2005, Baltimore, MD.

“Improving the Predictive Value of Preclinical Studies to Support Clinical Development” 19th Annual EuroDIA Meeting, March 28, 2007, Vienna Austria

“Key Considerations in Preclinical and Clinical Development of Stem Cell Therapies”, 19th Annual EuroDIA Meeting, March 28, 2007, Vienna Austria

“Preclinical Safety Evaluation of Biopharmaceuticals Facilitating Clinical Development: The Principles of ICH S6” BioEco 2007, June 26, 2007, Tianjin, China

“Key Considerations regarding Preclinical Development of Cell-Based Therapies: Facilitating Clinical Trials” Advances in Therapeutics Discovery and Development: Preclinical Cell-Based Therapy Research, MPI and WiCell, August 17, 2007, Augusta, MI.

Invited Speaker “Rational Design of Less Immunogenic Biotherapeutics”, BMWP/BWP Workshop on Immunogenicity Assessment of Therapeutic Proteins, EMEA, September 4, 2007, Canary Wharf, London

Preclinical Research and New Technologies in Medicine. The Impact on Conducting Clinical Research Inova Loudoun Hospital CRC Lecture, September 6, 2007, Ashburn, VA

“Preclinical Safety Evaluation of Biopharmaceuticals” Principles vs. Practices” ACCP 36th Annual Meeting Drug Development and Biotechnology: Update 2007, September 11th, San Francisco, CA

“The Investigational New Drug Application/Non-Clinical Day Requirements for the IND and NDA” Medicademy Module 3: The Regulatory Affairs Environment in the USA, November 7, 2007, Snekersten, Denmark

“The History of Biologics and the Regulatory Path”; Regulatory Aspects of Biologic Development”; “Toxicology of Stem Cell Products” PERI Biologics Drug Development: An Integrated Overview of Manufacturing, Nonclinical, Clinical, and Regulatory Requirements December 10, 2007, San Francisco, CA

“Introduction: Issues in Developmental and Reproductive testing of Biopharmaceuticals and Communication of Human Risk, SOT Annual Meeting, March 19, 2008

“Importance of NHP Animal Models of Disease for Enabling Biopharm Clinical Development with Particular Emphasis on Stem Cell Therapies”, 17th Covance Symposium Critical Contributions of Primate Models for Biopharmaceutical Drug Development, April 17, 2008, Munster, Germany

“Utility of Animal Models in HBOC Evaluation”, HBOCs: Current Status and Future Directions- CBER/NIH/DHHS, April 30, 2008, Bethesda, MD

“Considerations in Design of Preclinical Safety Evaluation Programs for Vaccines” Vaccine Quality Control and Safety Issues NICPBP, June 6, 2008, Beijing China

“Introduction: Regulatory Aspects of Preclinical Immunogenicity Testing; Where is Immunogenicity Covered, What is Expected, How is it Addressed”, DIA/AAPS Immunogenicity of Therapeutic Proteins, September 10, 2008, Bethesda, MD

“Preclinical Development Strategies for Biopharmaceuticals Based Upon Product Attributes” ISSX Symposium, October 14, 2008, San Diego, CA

“Preclinical Safety Evaluation of Stem Cell Therapies: Key Considerations for Facilitating Clinical Trials”, American College of Toxicology 29th Annual Meeting, November 12, 2008, Tucson, AZ

Selected Publications

J. A. Cavagnaro et al., 1995. Perspectives on the immunotoxicological evaluation of therapeutic products: assessment of safety. In *Methods in Immunotoxicology*, vol. 1, G.R. Burleson, H.H. Dean and A.E. Munson, Wiley-Liss, NY, pp37-49.

J.A. Cavagnaro. 1996. Safety Testing of Biotechnology Products. In *Comprehensive Toxicology*, vol. 2, *Toxicity Testing & Evaluation*, P.D. Williams and G.H. Hottendorf, Elsevier Science, pp. 291-298.

J. Cavagnaro. 1998. Influence of regulatory systems: A viewpoint of the US FDA process. In *Safety Evaluation of Biotechnology-derived Pharmaceuticals: Facilitating a Scientific approach*, S.A. Griffiths & C.E. Lumley, Kluwer Academic Publishers, UK, pp 31-38.

J.A. Cavagnaro. 2002. Preclinical safety evaluation of biotechnology-derived pharmaceuticals. *Nature Rev Drug Discov* 1: 469-75.

W. Frings and J.A. Cavagnaro. 2005. “Predicting Clinical Immunogenicity: Intended or Unintended” in *New Developments and Challenges in Primate Toxicology* eds Weinbauer, GF, Buse, E, Muller W and Vogel, F. Waxmann Munster, pp 9-21.

J. Clarke, C. Hurst, P. Martin, J. Vahle, R. Ponce, B. Mounho, S. Heidel, L. Andrews, T. Reynolds and J. Cavagnaro (2008). Duration of chronic toxicity studies for biotechnology-derived pharmaceuticals: is 6 months still appropriate? *Regul Toxicol Pharmacol* 50:2-22.

J. Cavagnaro (2008) The Principles of ICH S6 and the Case-by-Case Approach in *Preclinical Safety Evaluation of Biopharmaceuticals: A Science-based Approach to Facilitating Clinical Trials*, ed. J Cavagnaro, John Wiley & Sons, NJ. pp 45-65.

J. Cavagnaro (2008) Assessment of Carcinogenic Risk of Biopharmaceuticals in *Preclinical Safety Evaluation of Biopharmaceuticals: A Science-based Approach to Facilitating Clinical Trials*, ed. J Cavagnaro, John Wiley & Sons, NJ. pp 399-477

J. Cavagnaro (2008) Considerations in Design of Preclinical Safety Evaluation Programs to Support Human Cell-Based Therapies in *Preclinical Safety Evaluation of Biopharmaceuticals: A Science-based Approach to Facilitating Clinical Trials*, ed. J Cavagnaro, John Wiley & Sons, NJ. pp 749-781.

Professional Affiliations

Chesapeake Research Review (CRR) IRB - independent central IRB- (**Member since 2000- Co-Chair 2004 to present; Member Executive Committee and SAE Committee**)
 Institute for One World Health (a nonprofit pharmaceutical company), Ophtherion, NexBio, CaridianBCT Biotechnologies (Toxicology), (**Member – Scientific Advisory Boards**)
 American Society of Gene Therapy (ASGT)
 Society of Toxicology (SOT); National Capital Area Chapter society of Toxicology (NCAC-SOT)
 Regulatory Affairs Professional Society (RAPS)
 FDA Alumni Association (FDAAA) –**Charter Member**

Professional Appointments

2003 NIH Scientific Review Program – **Chairperson Review Committee** -In Vitro and Animal Models for Emerging Diseases and Biodefense
 2004 **US Proposal Reviewer** for International Science and Technology Center (ISTC) and Science and Technology Center in Ukraine (STCU) Project-CRDF Proposal Evaluation Form for Science -Harmonization of the Conditions Perform Pre-Clinical Trails According to the Russian and US Standards
 2002- 2006 National Gene Vector Laboratory **Steering Committee**
 2002- Present American Society of Gene Therapy **Industry Liaison Committee** (2002-2005) **Clinical and Regulatory Affairs Committee** (2005-2009)-**Chair (2008-2009)**
 1998 – Present Society of Toxicology
Education Committee (2001-2004); Chair Subcommittee for Minority Initiatives (2002-2003), Chair Committee on Public Communications (1997-1999)
 1995 – Present National Capital Area Chapter of the Society of Toxicology
President (1999-2000), Vice President (1998-1999)
 1996 – Present Regulatory Affairs Professional Society (RAPS)
Chair of the Board (2001-2002), President (2000-2001)
 1999 – 2002 (**Bio Industry Organization Rep**) to the Nonclinical Sciences Subcommittee of the FDA CDER/ Research Advisory Committee for Pharmaceutical Science
 2000 – Present Bio Organization
 Preclinical Safety Expert Working Group (BioSafe-**Founder and Committee Chair 2003-2005**); Past Member Regulatory Affairs Committee (RAC); RAC Lead Work Group
 2005- Present Drug Information Association (DIA) – (**North America Chairperson** – Biotechnology SIAC); **Biotechnology Track Co-Chair** Annual Meeting 2007 thru 2009
 2006- 2006 US Bio representative to APBI/BIA Early Stage Clinical Trials Taskforce

Selected Awards and Honors

Letter of Commendation (1996) From the Secretary of Health and Human Services for special tasks related to emergency preparedness planning for the 1996 Centennial Olympic Games

FDA Group Award (1996) for outstanding contributions regarding tissue engineered medical products for developing a strategy to evaluate associated safety and efficacy issues.

FDA Award of Merit (1994) for outstanding effort in the rapid approval of DNase for the treatment of cystic fibrosis.

FDA Award of Merit (1993) for outstanding leadership, which led to the FDA's ability to harmonize with the international community its pre-clinical reproductive and developmental toxicity guidelines.

FDA Commendable Service Award (1992) for outstanding leadership in design and review of pre-clinical studies of cytokine and growth factor products.

Additional Training

“Biotechnology: Strategies for Value Creation” - Kellogg Graduate School of Management Executive Program, March 13-16, 2002, Chicago, IL.-

“Advances in Tissue Engineering” – Rice University, August 14-17, 2002, Houston, TX.

“The State of Bioethics: From Seminal Works to Contemporary Explorations” –Georgetown University’s Kennedy Institute of Ethics, April 5-7, 2002, Washington, D.C.

“Bio-Pharmaceuticals for the 21st Century: Responsibility, Sustainability & Public Trust”- Fordham University Center for Ethics Education, January 10-11, 2005, NYC, NY.

2005 and 2006 Annual PRIM&R Conference

CITI Good Clinical Practices and ICH Course (June 2008) <https://www.citiprogram.org>

Personal Data

Place of Birth- Boston, MA. Married (1977), 3 children.

Community Service: Certified – Head Coach -Virginia Special Olympics (Volleyball, Swimming)