Vice President of Regulatory Affairs

AREAS OF EXPERTISE

- **Regulatory Affairs**
- **Drug Development**
- **Commercialization**
- **Pharmacology**
- **Patents**
- **Animal Model Development**
- **Pharmacokinetics**
- **Technology Transfer**
- **Clinical Trials**
- **Toxicology**

INTRODUCTION

Consultant's major career accomplishments includes over 12 product approvals from FDA including 6 new chemical entities, 510k device, and three major pharmaceutical efficacy indication supplemental approvals. All received 7-10 years of regulatory exclusivity (Hatch-Waxman, Orphan Drug). These products generated over $1 billion dollars in revenues annually. Busulfex was sold in 2008 for $200 million to Otsuka. Consultant has also filed over 40 investigational applications spanning pharmaceutical, device, biologics, biotechnology, and veterinary medicine. Investigational applications (IND, CTA, IDE) span indications in oncology, cardiovascular, metabolism, antidotes, neurology, gastrointestinal, anesthetics, sepsis, and autoimmune disease amongst others. Consultant has also assisted 4 young previously unlicensed manufacturing and testing firms in obtaining their first FDA establishment licenses. Consultant is an inventor on over 30 patents; at least one with each employer.

Consultant technical expertise includes pharmacology, pharmacokinetics, toxicology, and animal model development in mice, rats, rabbits, dogs, and primates. Development of existing and new or alternative methods for pre-clinical protein based drug evaluation both in vitro and in vivo. Sequence analysis, cloning, PCR, and in vitro protein expression in bacterial and mammalian systems. Protein purification and chemical modification. Preparation, purification and analysis of immunotoxins from design to clinical studies. Expertise in the synthesis and preparation of bifunctional chelating agents (EDTA analogs with chemically reactive side chains) and dye molecules for use as molecular probes on proteins. Radiolabeling of proteins by direct incorporation of the label (35S, 75Se, 14C, 3H labeled amino acids), radio-halogenation using a variety of techniques (iodogen, chloramine T, Bolton Hunter), and bifunctional chelation of metal atoms. Preparation of radiolabeled metal chelates (beta and gamma emitters and radiopharmaceuticals). Organic synthesis of internally radiolabeled chemicals (14-C, 35-S).

Routine use of a variety of analytical and preparative techniques: uPLC, HPLC, GC, gel, ion-exchange, and affinity column chromatography; thin layer and paper chromatography; polyacrylamide gel electrophoresis, and auto- radiography; dialysis and millipore filtering; Infra-Red, UV-visible, NMR, and fluorescence spectroscopy. Scientific glassblowing; Computer hardware includes IBM-PC, Macintosh, VAX 11-780, PDP11, CPM; Computer software includes a variety of word processors, (Word, Wordperfect, Samna, Wordstar, Valdocs, Edlin, etc.), spreadsheets (Excel, Symphony, Lotus, PeachCalc), and graphics packages (RS1, Cricket Graph, and others), computer programming (machine, assembly, basic, fortran, and others).

WORK EXPERIENCE

2010 – Present
Industry Consultant

02/2011 – 03/2015
QOL Medical, LLC
Vice President of Regulatory Affairs
Duties:

- QOL Medical is a profitable private pharmaceutical firm with 3 FDA approved products. Two of the products currently owned by QOL Medical were registered by Consultant (ElliottsB & Sucraid). Elliotts B was sold in 2013.
- Since joining the firm, and in addition to regulatory affairs, Consultant took on responsibilities for manufacturing and intellectual property, filing two Orange Book listable patents for Sucraid. Filed and obtained orphan designation for three products in Europe and the US. Organized and conducted 11 FDA meetings, most face to face with FDA.
- Consultant managed required site changes in 4 manufacturers and 2 laboratories due to regulatory compliance and site closure.
- Created and filed two patent applications which when issued will be FDA Orange Book listed for Sucraid.
- Attracted, hired and managed 4 staff, 2.5 in regulatory affairs, and 1.5 in quality.
- Assisted in the in-licensing of three new products, one of which he brought to the firm.

11/2009 – 04/2014
Altheus Therapeutics Inc., Oklahoma City, OK
Chief Operating Officer
Duties:

- Consultant was engaged initially in January 2009 to assist Altheus in correcting an IND clinical hold that had been in place for 30 months for a friend as a consultant.
- Later upon departure of the interim CEO was asked to come on board to assist the firm as its chief operating officer.
- During Consultant's tenure Altheus initiated and completed its first clinical trial (phase 1), has completed a series B funding round in 2012, and fully enrolled the pivotal mesalamine active controlled phase 2 proof of concept trial for Zoenasa®.

01/2006 – 12/2010
Eleos, INC., Plymouth, Minnesota
Vice President of Regulatory Affairs
Duties:

- Eleos is developing an antisense DNA drug substance for use in down regulating the p53 protein, initially for treatment of AML.
- In addition to his general management responsibilities, Consultant manages worldwide regulatory strategy, quality assurance, quality control, manufacturing, and assists with intellectual property and general management. Accomplishments:
- Set up Eleos Regulatory and Quality Assurance functions from scratch, hired 2 regulatory and one quality staff. Filed for and obtained chemical abstract registry number which allowed Eleos to obtain the cenersen generic name from USAN and the WHO, obtained orphan drug designation in the United States and Europe (AML, CLL, melanoma pending), obtained subpart E designation for cenersen positioning it for fast track and priority NDA review. Conducted two end of phase II meetings with FDA (melanoma, AML), initiated special protocol assistance process with FDA for

registration trials in AML (2 SPA to be approved soon), obtained SME status in Europe allowing for complete fee waiver on AML Scientific Advice submission.

- Two meetings were organized and conducted with the EMEA for cenersen. Scientific advice was obtained for cenersen from the EMEA, COMP and CHMP. Three Canadian CTAs were filed and approved.
- Organized internal trade name generation, filed and obtained approval from the US Patent and Trademark Office for Aezea™ (cenersen) for injection. Aezea trade name was filed with both the EMEA and the US FDA for advance regulatory approval (both in process and pending).
- Statutory patent extension submission prepared positioning cenersen to obtain the full additional 5 years of patent term restoration upon FDA approval of the NDA. Set up Eleos for filing electronically via uplink to both the EMEA (Eudralink) and FDA (Electronic Secure Gateway).
- In two years the Eleos regulatory correspondence database includes over 1100 entries pertaining to communications with regulatory body's worldwide on the first drug product cenersen. The quality assurance system was initiated and put in place for controlled documents, which now contains over 150 documents including master batch records, methods, specifications, protocols and SOPs.
- Awards: Consultant received an award from the Minnesota Intellectual Property Lawyers Association February 22, 2006 for his patents in support of Xyrem and Orphan Medical Inc. Consultant was also asked to testify at the June 29, 2010 FDA hearing on Rare Disease Therapeutics.
- In November 2009, due to severe financial conditions across the industry and the country, Eleos informed me that my compensation and time would be cut in half. However, Eleos allowed me to take on two other arrangements constituting 25% of my time each and those were Hennepin Life Sciences and Altheus Therapeutics Inc.

03/2010 – 12/2010
Hennepin Life Sciences LLC, Plymouth MN
Vice President of Regulatory Affairs
Duties:

- Consultant was engaged to assist in top line regulatory strategy and to initiate FDA regulatory activities for this completely new entity.
- HLS is developing technology for infectious disease that originated within the Medical School at the University of Minnesota.
- HLS achieved its first regulatory milestone on schedule under Consultant's leadership.

06/2010 – 04/2013
Biovest International, LLC
Consultant
Duties:

- Developed and helped institute worldwide regulatory strategy to turn around a stalled FDA registration for a phase 3 biological drug product.

02/2009 – 05/2010
CanReg INC., Toronto, Canada
Executive Regulatory Strategist
Duties:

- CanReg was, prior to its acquisition in November 2009 by I3 (now Optum Insight, a wholly owned division of United Health) the largest pure regulatory contract research organization in the world. Consultant was engaged to assist with client support primarily for the United States Regulatory activities and for Orphan Drug Development.
- Achieved two major strategic regulatory objectives for two client firms.

06/2005 – 12/2005
Jazz Pharmaceuticals Inc., Palo Alto, CA
Consultant
Duties:

- Consultant was contracted through the end of 2005 by Jazz to transfer all duties and responsibilities from Minnesota to Palo Alto, California.
- These included manufacturing, quality control, quality assurance, regulatory affairs and patent activity following the Jazz acquisition of Orphan Medical.
- Also, was incentivized by Jazz to obtain FDA approval for a pending Xyrem (sodium oxybate) label expansion.
- The clinical supplemental NDA (sNDA005) was approved by Rusty Katz on the user fee deadline with no queries or questions from the FDA Division of Neurology Products, a rare event.

05/1994 – 06/2005
Orphan Medical, Inc., Minnetonka, MN
Vice President of Regulatory Affairs, (05/1995 – Present)
Duties:

- Responsibilities while at Orphan Medical included Global Regulatory Affairs; Intellectual Property; Manufacturing; Quality Control, Quality Assurance and general public company management. Consultant also has served on the executive management committee participating in strategic corporate direction and new product selection and development. Consultant was appointed by the Board of Directors compliance officer for the firm when it was recommended by the Office of Inspector General for marketing companies (40 kb PDF).
- During his tenure at Orphan Medical Consultant developed and filed 8 marketing applications (6 NDAs, 1 NADA, 1 510k) and three major efficacy supplements resulting in increased regulatory exclusivity periods on key products. All FDA applications (INDs, Orphan Drug Applications, marketing applications, user fee waiver requests) were approved with no rejections, most approved by FDA within 6-12 months. Marketing authorizations for Orphan Medical products were authorized in Australia/New Zealand, Canada, Europe, Japan, Central America, and the Middle East. In addition the company maintained up to 20 active INDs at any one time. The company typically met face to face with FDA 8-20 times per year for pre-NDA, pre- IND, pre-NADA, pre-INAD, CMC, Risk Management, Orphan Drug as well as specific meetings with other FDA staff. These interactions included the FDA commissioner's office, orphan products division, Center for Foods, Center for Veterinary Medicine, field force, FDA General Counsel, etc. Orphan Medical received user fee waivers on all NDAs filed with FDA prior to the statute enactment exempting Orphan Drugs from application fees (PDUFA3).
- Consultant has chaired two successful FDA advisory committee meetings leading to FDA approval of two products (Busulfex and Xyrem). Two acts of the United States Congress were required to keep Xyrem in development for registration. In addition, he has also had experience with DEA for development of scheduled drugs including legislative scheduling via a congressional bill to place GHB into schedule III. Orphan Medical employed over 100 staff at the peak, with Consultant responsible for professional (J.D., Ph.D., B.S) and administrative staff in regulatory affairs, quality, and manufacturing. The firm underwent a 27% reduction in staff in 2003 as a result of the sale of three of its approved products (Busulfex, Sucraid, and Elliotts B) and the entire public firm was sold to Jazz Pharmaceuticals in June 2005.
- Consultant also had responsibility for manufacturing, quality control, quality assurance and intellectual property during his tenure at Orphan Medical. Orphan Medical never had any major compliance related audits that resulted in any impact on the patients, products, or shareholders. There were no drug product lot failures, recalls, or backorders nor any meaningful wastage from lot

expiry. The intellectual property at Orphan Medical was substantially strengthened through patent filings and regulatory exclusivity while Consultant managed this function.

- Awards: Consultant was twice the recipient of the FDA Commissioners Special Citation, first in 1999 for his work with Orphan Drugs and again in 2004 for his work with Xyrem (sodium oxybate) oral solution. Gamma hydroxybutyrate (Xyrem) was first mentioned when Congress debated and passed the initial Orphan Drug Act in 1984. It was not until Consultant and Orphan Medical took on this orphan drug in 1994 that marketing approval (2002) from FDA was granted in the midst of strong opposition due to abuse, and its use as a date rape drug.

05/1994 – 05/1995
Director of Regulatory Affairs
Duties:

- As the 7th employee of the firm, was responsible for instituting and developing a regulatory affairs department with global development focus. P
- rimary regulatory accomplishments during this tenure include the filing of 2 pre-NDA packages, 2 pre-NDA meetings held with CDER and approval by FDA of the proposed NDA plans. A pre-NADA meeting was held with the Center for Veterinary Medicine and FDA agreed to the proposed NADA package.
- In addition, three IND's were filed and accepted by FDA, and 4 pre-IND meetings were conducted with FDA. Hired one professional staff and one administrative professional.

1993 – 1994
CV Therapeutics, Inc., Mountain View, CA
Director of Development
Duties:

- Responsible for all development activities at this 10 person cardiovascular startup company. This included Regulatory Affairs, Manufacturing, Quality Control, Quality Assurance, Project Management, Preclinical (pharmacology and toxicology), and Process Development.
- Developed technology which went into manufacturing patent filings, subsequently issued. Set up contract GMP manufacturing for an anti-hyperlipidemic drug including formulation development. Obtained and completed a successful Pre-IND meeting with FDA.
- This program culminated in the successful IND filing for this company's first therapeutic development program in less than 12 months from the initiation of the project to the filing of the IND.

1984 – 1993
Xoma Corporation, Berkeley, CA
Director of Project Management, (1989 – 1993)
Duties:

- This new position was created in January of 1989 for the express purpose of implementing tighter controls on the multiplicity of ongoing projects at XOMA Corporation. The responsibilities associated with this position include direct project management of all established product areas, generation of time lines, recommendations to senior management on the allocation of internal resources, and reported directly to Pat Scannon, Founder President and Vice Chairman of XOMA Corporation.

XOMA versus Centocor, (April 17, 1990 - Verdict, October 28, 1991, Settlement June 1992)
Duties:

- Assisted Martin Goldstein JD (XOMA, General Counsel) until his departure in March of 1991. Coordinated the patent litigation for XOMA following the departure of corporate counsel which included the expeditious training of the new law firm (changed counsel from Allegretti & Witcoff in

Chicago to Kaye, Scholer, Fierman, Hays and Handler from New York in January of 1991 six months prior to trial). XOMA won a successful verdict on all questions asked of the jury. Due to successful verdict in the jury trial XOMA was able to settle with Centocor in June 1992.

Manager of Bio-Organic Chemistry (08-1986 – 01/1989)

Duties:

- Recruited and directed a staff of scientists (2 Ph.D., 1 B.S.) for investigations into new, proprietary, patentable diagnostic and therapeutic products in the fields of key technologies for XOMA Corporation (immunoconjugates consisting of monoclonal antibodies, linker technology, and toxins). This department handled all organic chemical synthesis at XOMA, and the biochemical investigations of these new synthetic molecules and their conjugates. The major accomplishments during 2 years as director of this department include the filing of 6 patent applications on chemical and biochemical inventions for improvements of existing immunoconjugates, and the synthesis, characterization, and development of a new linker in an immunotoxin which went into clinical testing.

Director of Sepsis Research (12/1988 – 01/1990)

Duties:

- In addition to other duties managed a staff of 1 Ph.D. and 1 B.S. to explore new biochemical approaches to clinically relevant human septic shock products. Served as chairman of the Sepsis Research and Development group, and assisted in the management of outside collaborative efforts. During tenure in this position developed one piece of the core basic science in support for E5 for inclusion in a Product License Application with the FDA. (Wood et. al 1992)

Director of Pharmacology (01/1988 – 01/1989)

Duties:

- This department handled all of the pre-clinical pharmacology and toxicology work performed at XOMA Corporation. This included pharmacokinetics, pharmacodynamics, some toxicology testing (LD50, Dose Range studies), and efficacy testing of new products in animal models. Major accomplishments include study design, implementation, and final report of the pharmacokinetics and tissue distribution of H65-RTA (an anti-CD5 immunotoxin) for inclusion in the product license application (PLA) submitted to the FDA in December of 1988; design, radiolabeling, and assistance in the interpretation of preclinical pharmacokinetics to support the PLA for XOMEN-E5 filed in March of 1989; development of a subcutaneous human xenograft model in nude mice for evaluation of the new formulation of 791- RTA30 and support of the investigational new drug (IND) amendment to the FDA in December of 1988; design, radiolabeling, and interpretation of the IND amendment to convert from ascites based antibody to tissue culture produced IND1 antibody for the melanoma immunotoxin project.

Manager of Radioimmunoimaging (01/1986 – 1989)

Duties:

- Project management from inception through clinical testing, and preclinical research and development of new and existing monoclonal antibody-bifunctional chelate conjugates. Support for scale up and clinical grade production of monoclonal antibody conjugates, including final release criteria and quality control. Design, management, and coordination of clinical testing of radioimmunoimaging agents. This includes protocol, and case report form design, interaction with US and European regulatory agencies, identification, recruitment, and support of principle investigators, and interpretation of clinical results and the associated regulatory filings for these drugs.

EDUCATION

University of California, Davis, California
Ph.D.: Physical Chemistry; thesis on Metal Selective Antibodies and Bifunctional Metal Chelates

University of California, Davis, California
Bachelor of Science: Chemistry

BOARD APPOINTMENTS

- Member of Executive Staff Committee (1987, 1989-1991 disbanded)
- Chairman of the Radiation Safety Committee, (1986, member 1984-1991) which includes many successful audits by the California Department of Health Services, Member of the Outside Preclinical Research Review Board (1986-1992)
- Chairman of the Cancer Immunotoxin Research Group (1988-1990 disbanded)
- Chairman of the Immune Related Disorders Immunotoxin Group (1988-1990 disbanded).

RECENT ACCOMPLISHMENTS

- Was recently issued his 34th patent. These patents are currently or have protected over $1 billion in branded pharmaceutical annual revenues.
- Instituted for the first time at a small company full eCTD compliant software for electronic filing through the FDA Electronic Secure Gateway (ESG) and Eudralink (total cost of $6,000).
- Obtained IND activation for a firm whose IND had been on clinical hold for 30 months within 4 months of engagement. Initiated and directed the phase 1 trial to completion. Put in place a simplified registration path to approval. As COO managed the initiation of a phase 2 pivotal controlled clinical trial to completion of the trial.
- Obtained FDA Orphan Drug Designation for a drug product previously rejected by the FDA Division of Orphan Products Development.
- Activated an IND (CTA for Europe & Canada) in the US, Canada, the United Kingdom, Germany and France via electronic upload (ESG) with paper CTA submissions outside the US.
- Set up 3 companies for FDA electronic ESG and European Eudralink submissions with electronic document rooms in house.
- Managed the formation and licensing of a new GMP manufacturing site in the United States, converting from a state pharmacy license.
- Obtained highly favorable FDA written result for a new chemical entity during the pre-IND process with almost complete acceptance of an initial phase 2 protocol (no phase 1 required) with simplified path to registration.
- Advised and obtained feedback which agreed with our proposal for a BLA related new manufacturing site to be constructed.
- Developed world wide regulatory strategy for stalled US FDA phase 3 development program, receiving encouragement from Canada and Europe to pursue registration.

PROFESSIONAL AFFILIATIONS

- Affairs Professional Society (RAPS), 1994-present
- Regulatory Affairs Certified (RAC) 1995, DIA; FDLI; AAPS
- American Association for the Advancement of Science (AAAS), 1980-present
- American Chemical Society (ACS), 1979-present
- Society of Nuclear Medicine, (1985-89)
- National Ski Patrol System, (1978-1994 retired)
- National Association of Underwater Instructors (NAUI) assistant instructor certification, 1975-1977

RESEARCH ACTIVITIES AND INTERESTS

- Pharmaceutical, biotechnology and device new product development and registration including: Regulatory registration strategy, product conception, formulation, synthesis, preclinical testing, animal testing, new animal model development through to clinical proof of efficacy and regulatory approval.
- Chemical purification, modification, and analysis of poly- and monoclonal antibodies for use in diagnostic and therapeutic human parenteral products.
- Development of new and alternative chemical means for protein-protein or protein-drug crosslinking. Pharmacology and toxicology of protein based diagnostic and therapeutic drugs in normal and immunosuppressed animals.
- Development of new methods for non-isotopic immunoassay (fluorescence and energy transfer), utilizing monoclonal antibodies.
- Basic studies on fluorescence and lanthanide luminescence and their applications to biological systems.
- Circuit design and instrumental development for measuring fluorescence lifetimes.
- Applications of Argon and dye lasers.

ADDITIONAL TRAINING

- American Chemical Society Meeting, August 1980, Las Vegas
- Pacific Slope conferences 1982, 1983, 1984
- American Chemical Society Meeting, May 1985, Miami
- American Chemical Society Meeting, September 1985, Chicago
- XOMA course on GLP, and GMP taught by Dan Whiker, 1985
- 1st Annual Meeting on Monoclonal Antibody Immunoconjugates in Cancer, March 1986, San Diego
- American Chemical Society Meeting, April 1986, New York
- National Meeting of the Society of Nuclear Medicine, June 1986, Washington, D.C.
- Management Training Seminar sponsored by XOMA Corporation 1986, taught by Dave Brewer, Director, Human Resources
- Annual Meeting of IRIST, February 1987, Nottingham, UK
- 2nd Annual Meeting on Monoclonal Antibody Immunoconjugates in Cancer, March 1987, San Diego
- National Meeting of the Society of Nuclear Medicine, June 1987, Toronto
- Second Enzon Corporation sponsored conference on "Innovations in Protein Therapeutics; from Research to the Clinic" held at the Walt Disney World Resort, December 1987, Florida
- 3rd Annual Meeting on Monoclonal Antibody Immunoconjugates in Cancer, February 1988, San Diego

- National Meeting of the Society of Nuclear Medicine, June 1988, San Francisco
- 4th Annual Meeting on Monoclonal Antibody Immunoconjugates in Cancer, March 19, San Diego
- American Society of Clinical Oncology and the American Association for Cancer Research, May 1989, San Francisco
- Hambrecht & Quist Incorporated Annual Life Sciences Conference, 1989, 1990, 1991, 1992, San Francisco
- 30th Interscience Conference of Antimicrobial Agents and Chemotherapy, October 1990, Atlanta
- Prudential Conference, Spring 1991
- FDA Vaccines and Related Biologics Advisory Committee Meeting, September 4, 1991, Bethesda
- 55th Annual Meeting American College of Rheumatology, November 1991, Boston
- Licensing of Biotechnology Products in Europe of the 1990's, A perspective from the Medicines Control Agency of the UK. Dr.. David Jeffreys and Dr. John Purves, August 27, 1992, Los Angeles California. Sponsored by Amgen and Genentech.
- 32nd Interscience Conference of Antimicrobial Agents and Chemotherapy (ICAAC), October 1992, Anaheim California.
- BioEast Conference, Washington D.C. January 1993.
- American Chemical Society Annual Meeting, San Diego, March 1994.
- Regulatory Affairs Professional Society Annual Meeting, Washington D.C., September 1994.
- Pharmaceutical Stability course, Charlotte, North Carolina March 1995.
- Regulatory Affairs Professional Society Annual Meeting, Washington D.C., September 1995.
- Drug Information Association annual meeting, San Diego, California, June 9-12, 1996.
- Regulatory Affairs Professional Society Annual Meeting, Washington D.C., September 1997.
- St. Thomas University, Minneapolis course on Negotiation Skills: Win/Win solutions taught by David Dunn completed November 1997.
- DIA, June 7-11, 1998 Boston
- RAPS, September 26-28, 1998, Washington DC
- FDA Oncological Drugs Advisory Committee (ODAC), 59th meeting November 16, 1998, Bethesda MD.
- FDA ODAC Meeting January 11, 1999, Presented on Busulfex NDA for Orphan Medical
- Orphan Products, September 16-17, 1999 Vienna VA presented “Understanding Orphan Product Development Issues—How do they differ from non-Orphan Development, and “Reaping the Benefits of your Orphan Product by strategically Developing Marketing and Sales in your Company.”
- After 1999 no longer maintained current.