農化系　60 級

黃甲煌

現職

Chief Scientific Officer, Swabplus Inc.
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經歷

01. Over 25 years of Research and Product Development, upstream and downstream process scale up expert and cGMP biologic (monoclonal antibody and recombinant proteins and viral vector) manufacturing in the pharmaceutical and biotechnology industries. Successfully transformed laboratory R&D project to clinical candidates. Expert in FDA guidance and compliance regulations for biologic and medical device manufacturing, designed and built cGMP clean room production facility (both in US and Taiwan). I have hands-on experienced both monoclonal antibody(or other biologics) and virus vector clean room cGMP production. (The design of air handling in cleanroom was different to prevent cross contamination.)

02. A major contributor in a highly motivated AIDS Task Force. In 1984, We were one of five-research groups in US granted the privilege to have a 9-KB HTLV-III (later named HIV genome), no sequence and restriction map available at the time. We raced to decode the sequenced and express various domains of HTLV-III antigen (gag, env, and pol.) in E. coli and yeast. We applied shot-gun approaches to complete our task. We (I) have successfully expressed both env and gag gene in E. coli. We had screened panels of AIDS patient sera samples and defined the common epitopes for the development of diagnostic test and therapeutic applications. Had traveled every month to NIH to report project progress and attended scientific discussion with prominent scientists such as Denis Bolognese, Robert Gallo, and Flossy Wang-Stahl. Ten years later, in 1995, I was asked to make a deposition on a court document and authenticated that my (1984) recorded, signed and dated note book pages to define the "priority date of finding/invention" (the discovery and right of HIV detecting kit was sold to Abbott Laboratory who battled the patent priority date

Attending 2015 So Cal NCHU AA annual function

against Chiron company). My research discover was the bases of diagnostic test development to screen "contaminated blood" samples and prevent spreading of HIV virus. We have published scientific findings in Nature, Science, and PNAS.

03. Developed and published the first adenovirus column chromatography (Human Gene Therapy 2002), and affinity column purification scheme for Adenovirus Associated Virus (AAV, Human Gene Therapy 2000). Adenovirus purification batch was about 1.0x1016 particle of adenovirus, 100 time scale greater than standard ultra-centrifugation adeno purification protocol, largest scale purification ever published. Even today, I still received reprint request of the article. The technology in Adenovirus purification facilitate larger scale adenovirus bases clinical and gene therapy possible. Adenovirus facilitated larger gene and AAV for smaller gene transfer, in human gene therapy studies.

特殊事蹟

01. (In Taiwan) Study Director: Technology Development and Medical application of "Unidose Applicator" -First Year Project (Swabplus' Taiwan DaAn Bioscience Co-Sponsor; Budget NT$35MM). Project completed November 2012. In 2013, Built a cGMP clean room for medicated swab production facility at Kao Hsiung Science and Technology Park. Bring the technology and expertise back to Taiwan, home country.
02. Developed column purification methodology for virus production. Due to excellent purity

Together with Frank Lu made trip to attend San Francisco NCHU AA function.

and infectivity, our column purified adenovirus was adopted by Adenovirus Reference Material Working Group as (US) national and international gold standard of adenovirus vector. Together with affinity column purification of AAV, we're supporting over six reginal gene therapy research centers, by providing much needed gene therapy viral vectors to study directors.

03. Completed a novel and unprecedented gene synthesis by making single-stranded 216 oligomer and 219 oligomer, followed by amplification by a pair of PCR primers to complete platelets derived PLA2 gene synthesis, saved over millions of dollars potential licensing fee for Sterling Winthrop. Platelets derived PLA2 was implicated in joint inflammation. Same technology was adopted for synthesized many genes of HIV genome (with build-in restriction sites and silent mutation for high level recombinant protein expression).

得獎感言

This is my greatest honor in my career as the finalist of National Chung Hsing University Extinguished Alumni (國立中興大學第 20 屆傑出校友). I want to thank "The Panel of Extinguished Alumni Reviewing Committee (第 20 屆傑出校友評審會委員)" for bestowing this great honor.

I appreciate the nomination and endorsement of the Directors of Southern California National Chung Hsing University Alumni Association without your efforts, this would have been impossible, especially we moved from Philadelphia to Los Angles in 2009. I am humble because the talent pool of Southern California NCHU AA is tremendous, like Mr. An Lee's movie entitled "Crouching Tiger Hidden Dragon".

Again, thank you very much. It is a privilege to be recognized as 第 20 屆傑出校友.

My name is James Jea-Huang Huang (黃 甲煌), graduated from Agricultural Chemistry Department Soil Science and Fertilizer Division, in 1971. It seems like just a few years back. I remembered vividly some 40+ year ago, our

department Head was Ms. Maria Wu, with a group of outstanding professors and teachers and our class consisted of 40 students.（系裡老師：吳敏慧主任、楊彬良老師、王銀波老師、王明國老師、楊策群博士、莊作權博士、黃盤銘博士、 孫志寧博士等多位師長）

Mr. Yang, two Mr. Wang's, Dr. Yang, Dr. Chung, Dr. Huang, and Dr. Sun etc., and our class consisted of 40 students.

I was born in a small country village of YuanLin（員林。東山）, at the foothill of Bar-Gua mountain（八 卦 山）. I am the oldest of four brothers. My dad was an elementary school music teacher, and my mom was a tailor, and for that reason my brothers and I always had the newest clothes for Chinese New Year b/c they were sewn on New Year's Eve.

After middle school, I was not home much and I missed my parents. However, I cherished the time I stayed home during school breaks. Since we had an orchard with all kinds of fruits by the mountain side, I helped harvesting and transporting the harvests to the market during school breaks. We carried on our shoulders the harvest from the orchard field to our home (about 3 Km), then the harvest was examined, treated if needed, and seized so that next morning we could truck them to the Farmer Market (Fruit and Vegetables) at the town center of YuanLin.

Since high school (Taichung First High School for boys1964-1967), I was living outside of my home town, for college, graduate school, military service, getting married, becoming a lecturer at NCHU, and going abroad in 1977. My wife, Janie and I had two boys Christopher and Charles; Christopher was born at Taichung and Charles in America in Akron, Ohio. We would try to come home to Taiwan every 4-5 years to visit our parents and siblings. Our first trip home back took longer than planned was in the summer of 1984.

Like many of you, I spent 20 plus years in school: attended 東 山 elementary school, two middle schools, a high school, and four universities (National Chung Hsing University, Graduate Institutes of National Taiwan University, Kent State University, Kent, Ohio 1977, and North Carolina State University, Raleigh, NC, 1978-1982). I did my post-doctorate training at Chemical Engineering

Recent trip to Hawaii, Individual photo (last year S Cal NCHU AA banquet)

Department, Purdue University, Indiana. After that I went through many career and company changes due to the mobility of the biotech job market. We lived primary in Philadelphia, PA for about 25 years, I was with Centocor, du Pont, Eastman Pharmaceuticals (Sterling Winthrop Pharmaceuticals), Lexin Pharmaceutic, Goodwin Biotech (Fort Lauderdale, FL), University of Pennsylvania (Institute for Human Gene Therapy), WuXi Biotech, Cook Pharmica (Bloomington, IN), Lancaster Laboratory, and in 2009 I joined Swabplus Inc. as Chief Scientific Officer (Rancho Cucamonga, CA).

I have over 30 years of Research, Process and Product Development, upstream and downstream process scale up expertise and cGMP biologic (monoclonal antibody and recombinant proteins and viral vector) manufacturing experience in the pharmaceutical and biotechnology industries. I have successfully transformed laboratory R&D project to clinical candidates. I' m considered an expert in FDA guidance and compliance regulations for biologic and medical device manufacturing, have designed and built cGMP clean room production facilities (both in US and Taiwan). I have hands-on experienced in monoclonal antibody (or biologics, 100 grams scale) and virus vector clean room cGMP production. The design of air handling and personnel flow in cleanroom cGMP production was very different to prevent cross contamination.

Although my father would like me to be a medical doctor, I ended up in biomedical research and (bio) drug manufacturing. I would like to share some of the key accomplishments I am proud of during my career:

1, As a contributor, in a highly motivated AIDS Task Force. In 1984, Centocor was one of five-research groups in the United States granted the privilege to have a 9-KB HTLV-III DNA fragment (later named HIV genome), at that time there was no sequence and restriction map available. The world (especially U.S. and France) were racing to quickly decode the sequences and to express various domains of HTLV-III antigen (gag, env, and pol.) in E. coli and yeast. We applied a shot-gun approach to complete our tasks in sequencing and molecular expression. I successfully expressed both env and gag gene

in E. coli. Our team screened against panels of AIDS patient sera samples and defined the common epitopes for the development of AIDS diagnostic tests and therapeutic applications. I traveled every month to the National Institute of Health to report on project progress and attended scientific discussions with prominent scientists such as Denis Bolognese, Robert Gallo, and Flossy Wang-Stahl.

About ten years later, in 1995, I was approached by legal representatives and asked to make a deposition on a court document to authenticate my signed and dated note book pages from 1984 that they' ve reproduced to verify they were true and accurate. Later I was told, Centocor had sold the right of HIV detecting kit to Abbott Laboratory who had litigations against biotech giant Chiron Corporation. It was of utmost important to establish the "priority date of finding/invention" relevant for the HIV detection kit. One of my research discoveries was the base of the diagnostic test development to screen "contaminated blood" samples and prevent spreading of HIV virus. Fortunately I had documented my scientific discoveries in my bound notebook and it was properly dated and signed. We have published the scientific findings of this work in journal such as Nature, Science, and PNAS.

2, I utilized systematic approaches in my research. For molecular expression, there was no universal vector that could have accommodated high level expression of all genes. One has to test each expression vector (promoter) one-by-one systematically. I had achieved many high level expressions in E. coli (greater than 20% total protein per cell) of soluble non-fusion recombinant biologics such as IL-1β and TNF, and IL-7 for structural biology study, inhibitor screen and facilitate rational drug design. I used promoters such as lacZ, Trp, chemotaxis, β-glucuronidase, lambda phase, and T7 in searching for high level and soluble expression of recombinant protein in E. coli. Production of soluble recombinant, not the inclusion bodies, was an art of expression science. Only the old cloner could appreciate the value of "soluble protein" expression.

3, Understood the fundamentals and take risks. As the head of an expression lab, I had a DNA

Synthesizer and a polymerase chain reaction (PCR) machine at my disposal. I completed a novel and unprecedented gene synthesis by making single-stranded 216 oligomer and 219 oligomer, followed by amplification by a pair of PCR primers to complete platelets derived PLA2 gene synthesis, and as the result saved millions of dollars in licensing fees for Sterling Winthrop. Platelets derived PLA2 was implicated in joint inflammation, anti-inflammation was one of the major research focus of drug industries. The same technology was adopted for synthesizing many genes of the HIV genome with build-in restriction sites and silent mutation to accommodate high level recombinant protein expression.

4, Networking, and sharing resources. I supplied >300 mg of column purified high potency IL-1 to NIH CBER, (market value was greater than 3 million dollars) and promoted interleukin anti-cancer, and immunological studies. We patented a series of IL-1 muteins that exhibited increased or decreased biological activity. I was the study director of a computer assisted rational drug design project and anti-cancer research, using TNF, IL-1 and IL-2. (Selected findings were publications in Journal of Immunology and PNAS)

5, Work hard and work smart. I developed and published the first adenovirus column chromatography (Human Gene Therapy 2002), and affinity column purification scheme for Adenovirus Associated Virus (AAV, Human Gene Therapy 2000). My adenovirus purification batch was about 1.0x1016 viral particles of adenovirus, a scale of 100 times greater than the standard ultra-centrifugation adeno purification protocol, and the largest scale purification ever published. To this day, I still received reprint requests of the article. The technology in Adenovirus purification enabled larger scale adenovirus bases clinical trial and gene therapy possible. The infectivity of adenovirus was certified by the IHGT leading scientist. Adenovirus facilitated larger gene and AAV for smaller gene transfer, in human gene therapy studies.

6, Think outside the box. I developed a first "Protein A-IgM" affinity column for monoclonal antibody purification (Protein A is typically for IgG affinity purification) and three-columns in tandem, size exclusion chromatography for bio -herbicide production.

I developed column purification methodology for virus production. Due to excellent purity and infectivity, our column purified adenovirus was adopted by Adenovirus Reference Material Working Group as a (US) national and international gold standard of adenovirus vector. Together with affinity column purification of AAV, we' re supported over six regional gene therapy research centers in the tristate area, by providing much needed gene therapy viral vectors to clinical study directors.

7, Drug development must meet regulatory requirements: identify, purity, sterility and efficacy. At the Institute for Human Gene Therapy (IHGT), Dept. of Molecular & Cellular Engineering, University of Pennsylvania, as the Director of Vector Production, I produced over 80 batches of adenovirus and adeno-associated virus annually to support regional (Tristate: New York, New Jersey and PA) human gene therapy programs. We directly delivered viral vectors to operation rooms from our -70C freezer and actively participated in scientific discussions, monitor patient' s immune response throughout the study.

Below are some accomplishments with Taiwan:

1, I worked as the Study Director: Technology Development and Medical application of "Unidose Applicator" - First Year Project (Swabplus' Taiwan DaAn Bioscience Co-Sponsor; Budget NT$35MM). Project completed November 2012. In 2013, I built a cGMP clean room for medicated swab production facility at Kao Hsiung Science and Technology Park. I was proud to bring the technology and expertise back to Taiwan.

2, I sought the opportunity to channel technology resources and personal expertise (expression of recombinant protein, scale up, cGMP clinical production of biologics, flu vaccine production) back to home country by visiting universities, research institutions and as an invited seminar speaker at National Chung Hsing University, Yang Ming Medical University, Ching Hua University, and Biotechnology Development Center.

3, I was a Lecturer of Soil Science Department and taught Soil Microbiology (1975-1977).

In Conclusion:

Over my career, I would like to thank a few people who' ve helped me along the way and share some final thoughts:

1, I would like to acknowledge my father for his support and encouragement, although I' m not a physician but the results of my research have helped save many lives; to my mother for her loving care and my family for their supports and sacrifices.

2, It is my hope that my experience might encourage and inspire young scientists in pursuing basic biomedical research, as the opportunity to advance science and help society is very rewarding.

3, My bosses (Drs. Jason Shih, Barry Jones, Chip Shearman, Fred Larimore) referred to me as a complex expression technician, innovative cloner and inspirational gene designer, and a rare hybrid of DNA cloner and protein chemist. I am proud to have gained these compliments by my peers and superiors by my work.

4, There are no easy tricks to reach this stage of my career. It took a lots of hard work, through gathering in-depth knowledge, systematic design/ approaches and careful executions. Work hard and work smart.

5, To my Alma Mater, thank you for preparing a solid foundation of rigorous study and hard work. (Note: Everybody can express a gene or two, but what matters the most is who did it first, and that makes all the difference.)

Family photos (The 43rd wedding anniversary)