SHU-JEN D. CHIANG, Ph.D.

SUMMARY

Thirty-five years of experience in recombinant DNA technology, genetics and biochemistry, including 28 years of industrial experience in R&D, fermentation and product purification process development. Applied genetic engineering technology to microbial and fungal strain improvement, metabolic pathway engineering, recombinant protein expression and biotransformation. Has experience in pharmaceutical fermentation and purification process optimization, scale-up, process validation and GMP operations. Also has experience in CMC document preparation and filing to health regulatory agencies. Technical accomplishments include gene cloning, vector construction, heterologous gene products, fermentation and purification process improvement and implementation of improved process in comnmercial scales. Offers excellent project planning, project management and interpersonal skills.

PROFESSIONAL EXPERIENCE

Sr. Advisor, Rondaxe Pharma, LLC – July 2009 –Present
Fermentation, biotransformation and biotechnology consulting

Visiting Professor, Fu-Jen Catholic University – September 2010-January 2011
Biotechnology, Bridging Basic and Industrial Microbiology

Bristol-Myers Squibb Company – September 1985-June 2009

Associate Director – 2005-2009
Group Leader - 2000-2005
Manager – 1998 – 2000
Senior Scientist – 1985-1998

- Responsible for scientific leadership, management, internal and external technology transfer, budgeting and establishing intellectual property position.
- Led inter-departmental fermentation and biotransformation projects: manufacturing process development, optimization and scale-up; API manufacturing tech support.
- Responsible for fermentation equipment and process validation.
- Supporting CMC document preparations for new drug applications.
- Experience with the expression and regulation of biosynthetic genes for secondary metabolites in various bacterial species and filamentous fungi; developed cloning and expression vectors, cloned genes for secondary metabolite biosynthesis and industrial enzymes; developed DNA transformation and expression systems in filamentous fungi and various bacterial species.
- Generated recombinant microbial strains with increased productivity of antibiotics and industrial enzymes: strain improvement; fermentation and biotransformation process development, enzyme and antibiotic manufacturing.
- Generated recombinant fungal strains producing new β-lactam antibiotics.

Molecular Biologist, Abbott Laboratories, Department of Molecular Biology – December 1983-August 1985
Investigated genetic and biochemical controls of antibiotic biosynthesis in streptomycetes: development of *E.coli-Streptomyces* cloning vectors, actinophage vectors, and cloning of antibiotic biosynthesis genes of streptomycetes**.**

Research Molecular Biologist, SDS Biotech Corporation (Diamond Shamrock Corp) – February 1982 – November 1983

Studied transcriptional regulation of heterologous gene expression in *E.coli*. Identified molecular targets for animal and plant growth enhancers or inhibitors. Developed and implemented high throughput assays for synthetic compounds and natural products screening. Initiated research areas in *Streptomyces* genetics.

NIH Postdoctoral Fellow, University of Alabama in Birmingham, Department of Microbiology – January 1981-January 1982

Conducted research in molecular cloning of the RNA genomes of and genetic mapping of the viral genes.

Research Fellow, University of Texas at Dallas, Department of Biology – September 1979-December 1980

Studied the transposition mechanism of an ampicillin-resistant transposon. Studied genetics and functional organization of plasmid R6K.

EDUCATION

Ph.D., University of Texas at Dallas, 1979, Major-Molecular Biology
M.S., University of Texas at Dallas, 1976, Major – Molecular Biology
B.S., Fu-Chem Catholic University, 1971, Major - Biology

HONORS, AWARDS AND GRANTS

2009	BMS Tech Ops Presidents Award
2010	US EPA Presidential Green Chemistry Challenge Award
2003	IMPACT One BMS Award
2003	One BMS Achievement Award
1996-1998	BMS Excellence Award
1981	American Cancer Society Institutional Research Grant (Molecular Virology)

PUBLICATIONS

Nayeem, A., S.J.,Chiang, S.W.Liu, Y.Sun, L. Lou and J. Basch, 2009 – Engineering Enzymes for improved catalytic efficiency. A computational study of site mutagenics in epothilone-B hydroxylase. *Protein Engineering, Design and Selection, 22:257-266.*

Basch, J. and S.D. Chiang, 2007 – Cloning and expression of a cytochrome P450 hydroxylase gene from *Amycolatopsis orientalis* strain SC15847: Hydroxylation of epothilone B for production of epothilone F. *J Ind. Microbiol. Biotechnol. 34:171-177.*

Steele, C.L., Y.Chen, B.A. Dougherty, W. Li, S. Hofstead, K.S. Lam, Z. Xing, S. D. Chiang, 2005 – Purification, cloning and functional expression of phenylalanine aminomutase: The first committed step in Taxol side-chain biosynthesis. *Arch. Biochem. Biophys.* 438:1-10.

Basch, J., T. Franceschini, S. Tonzi, S. D. Chiang, 2004 – Expression of a cephalosporin C esterase gene in *Acremonium chrysogenum* for the direct production of deacetylcephalosporin C. *J. Ind. Microbiol. Biotechnol. 1:531-539.*

Chiang, S. D. – Strain improvement for fermentation and biocatalysis process by genetic engineering technology. *J. Ind. Microbiol. Biotechnol*. 31:99-108.

Chiang, S.D. and J. Basch, 1999 – Cephalosporins. In "*Encyclopedia of Bioprocess Technology: Fermentation, Biocatalysis and Bioseparation*.", M. D. Flickinger and S. Drew (eds.), John Wiley & Sonc, Inc, New York, pp/ 560-570.

Basch, J. and S. D. Chiang, 1998 – Genetic engineering approach to reduce undesirable by-products in cephalosporin C fermentation. *J. Ind. Microbiol. Biotechnol. 20:334-353.*

Burnett, W.V., S.D. Chiang and R.P. Elander, 1998 – Application of PCR in fungal biotechnology. In "*Application of PCR in Mycology*", P.S. Bridge, D. Arora, R.P. Elander and C.A. Reddy (eds.), CAB International Wallingford, UK, pp. 187-203.

Chiang, S.D., L.T.Chang, H.H. Hou and R.P. Elander, 1993 – Stain improvement in *Penicillin chrusogenum*: From classical genetics to genetic engineering. In "*50 Yrs of Penicillin Application – History and Trends*", H. Kleinkauf and H. vonDohren (eds.), Public Ltd., Prague, pp. 245-257.

Kline, E.L., S.D. Chiang, D. Lattora and W. Chuang, 1992 – Cloning of a promoter-like soybean DNA fragment responding to IAA induction in Escherichia coli K12. *J. Biochem*. 111: 168-174.

Usher, J.J., D.W. Hughes, M.A. Lewis and S.D. Chiang, 1992 – Determination of the rate-limiting step(s) in the biosynthetic pathways leading to penicillin and cephalosporin. *J. Ind. Microbiol*. 10: 157-163.

Elander, R.P. and S.D. Chiang, 1991 – Genetics and antibiotic process improvement: From classical genetics to genetic engineering. In "*Recombinant DNA Technology and Application*", A. Prokop, R.K. Bajpai and C.S. Ho (eds.), McGraw Hill, Inc., New York, pp. 153-170.

Whitkop, C. and S.D. Chiang, 1989 – Gene cloning. In "*Genetic Engineering Technology in Industrial Pharmacy: The Principles and Applications*", J.M.Tabor (ed.), Marcel Dekker, Inc., New Yorki, pp. 17-63.

Brown, D.P., S. D. Chiang, J.S. Tuan and L. Katz, 1988 – Site-specific integration of *Saccharapolyspora erthaea* and multisite integration of *Streptomyces lividans of antiomycete plasmid pSE101*. *J. Bacteriol*. 170:2287-2295.

Brown, D.P., J.S. Tuan, A. Boris, J.P. Dewitt, K.B. Idler, S.D. Chiang and L. Katz, 1988 – Plasmid-chromosome interactions in *Saccharopolyspora erythraea* and *Streptomyces lividans. Develop. Ind. Microbiol*. 29:97-105.

Katz, L., S.D. Chiang, J.S. Tuan and L.B. Zablen, 1988 – Characterization of bacteriophage C69 of *Saccharopolyspora erythraea* and demonstration of heterologous actinophage propagation in *Streptomyces* and *Saccharopolyspora. J. Gen. Microbiol*. 134:1765-1771.

Portmorem, J. W.V. Burnett and S.D. Chiang, 1987 – Bifunctional cosmid vector for *Streptomyces. Biotechnol. Lett*. 9:7-12.

Chiang, S.D., E. Jordan and R.C. Clowes, 1987 – Inter-and intramolecular transposition and transposition immunity in *Tn3* and *Tn2660*. Mol. Gen. Genet. 187:187-194.

Chiang, S.D. and R.C. Clowes, 1982 – Recombination between two Tn*A* transposon sequences oriented as inverse repeats is found less frequently than between direct repeats. *Mol. Gen. Genet*. 185:169-175.

Clowes, R.C., P.L. Holmans and S.D. Chiang, 1981 – Intramolecular transposition of a β-lactamase sequence and related genetic rearrangements. *Cold Spring Harb. Symp. Quant. Biol*. 45:167-171.

Chiang, S.D. and R.C. Clowes, 1981 – Differences in recombination between two transposon sequences oriented as direct and indirect repeats. In "*Molecular Biology, Pathogenicity and Ecology of Bacterial Plasmids*". S.B. Levy, R.C. Clowes and E.L. Koenig (eds.), Plenum, New York, p. 591.

Chiang, S.D. and R.C. Clowes, 1980 – Intramolecular transposition and inversion in the plasmid R6K. *J. Bacteriol*. 142: 668-682.

Fan, P.C. and S.D. Chiang, 1971 – Recovery, distribution and development of *Schistosoma mansoni* in mice following unisexual intraperintoneal infection with suggestion of a possible route of migration of *Schistosomes* of man in mammalian hosts. *Chinese J. Microbiol*. 4: 182-189.

U.S. PATENTS

US5516679	Chiang, S.D., S. Tonzi, W.V. Burnett – Penicillin V aminohydrolase gene from *Fusarium oxysporum*.
US2002/0048781	Chiang, S.D. and J. Basch – Direct production of desacetylcephalosporin C.
US6884608 B2	Basch, J.D., S.D. Chiang, S.W. Liu, A. Nayeem, Y. Sun and L. You – Compositions and methods of hydroxylating epothilones.
US7172884 B2	Benigni, D., R. Stankavage, S.D. Chiang, H. Hou, B. Egan, D. Gu, D. Hou, L. Mintzmyer, T.P. Tully, B.L. Davis, I. Hagro, M. Mascari, G. Galvin, G. Stein, C. W. McConlogue and F.T. Comezoglu – Methods for prepation, isolation and purification of epothilone B and x-ray crystals of epothilone B.
US2006/0270012 A1	Bowers, N., P. Skonezny, G. Stein, T. Francheschini, S.D. Chiang, W.L. Anderson, L. You and Z. Xing – Process for preparing (2R-3S)-1,2-Epoxy-e-(unprotected) amino-4-substituted butane and intermediates thereof.

PROFESSIONAL SOCIETIES

American Chemical Society
Society of Industrial Microbiology