M. R. Azari Ph.D.

22633 Crespi Street
Woodland Hills Ca, 91364
Home (818) 591-0316
Office (805) 372-3383
Cell: 818) 618-8275

CAREER SUMMARY:

Over 42 years of contributions in the field of Biochemistry starting as a junior chemist, acquiring valuable knowledge, experience and recognition as a result of promotions to progressively more responsible technical/management positions. Consistent academic achievements and growth to support career objectives culminated in receiving 1986 Calbiochem- Behring Diagnostics' "Scientist of the Year", 1994, 1995 Baxter's "Special Technical Accomplishment" and 1996 Baxter's "Technical Achievement" awards.

EMPLOYMENT HISTORY:

2011-Present
Independent Consultant in Biotechnology

1999-2011
Baxter Healthcare, BioScience, Operations
Thousand Oaks/Westlake Village, California
Director of Global Technology Services/Implementation of New Products/Special Projects

1991-1999
Baxter Healthcare, Biotechnology division, Blood Substitutes Group
Round Lake, Illinois
Director- Process Development and Clinical Manufacturing

1988 - 1991
BAXTER HYLAND, Operations/Corporate Blood Substitutes Group
Glendale, California
Manager- Hemoglobin Process Development and Pilot Scale Manufacturing

1982 - 1988
CALBIOCHEM- BEHRING DIAGNOSTICS
A Division of American Hoechst Corp.
La Jolla, California
Manager- Enzymes Section (R&D and Production Departments)
Group Leader- Enzymology R&D Department
Group Leader/Senior Research Chemist- Enzymology R&D Department

1979 - 1982
UNIVERSITY OF SURREY
Guildford, Surrey, United Kingdom
Ph.D. Student and Departmental Lecturer/Demonstrator-Biochemistry

1977 - 1979
GENETIC RESEARCH INSTITUTE OF IRAN
Associate Director

1975 - 1979
JUNDI SHAPUR UNIVERSITY (College of Science and Technology)
Ahvaz, Iran
Lecturer of Industrial Biochemistry and Fermentation Technology

1969 - 1975
CALBIOCHEM
Enzymes Pilot Plant and Process Development Laboratory
La Jolla, California
Laboratory Supervisor
Senior Chemist
Chemist
Junior Chemist

MANAGEMENT, MANUFACTURING, RESEARCH, TECHNICAL and WORK EXPERIENCES:

Management and Manufacturing:

Experienced manager at all levels. Managed people (10-50 professionals), budgets ($2-15M) and projects for thirty years. Earned a Master Degree in Management Science and continuously trained in various topics and levels of management such as "Interaction Management", "Middle management" and "Financial Management".

- Managed the manufacturing of pharmaceutical grade protein products.
- Managed process development laboratories for protein and related products for thirty years.
- Managed the implementation of GLP in developmental laboratories and GMP in pilot and commercial scale manufacturing plants.
- Transferred technology inter-continentally and domestically.
- Managed the scale-up and process engineering of production schemes.
- Managed the implementation of aseptic/sterile techniques.
- Managed process validation works including those of virus inactivation and removal.
- Managed building Plants for manufacturing native and recombinant proteins

Research:

Ph.D. Thesis Topic: A Study of Cytochrome P-448, a component of Mono-oxygenase System from Saccharomyces cerevisiae - Purification and Characterization.
Please see bibliography.

Technical:

- Trained in molecular enzymology. Experienced in isolation, purification, and stabilization of enzymes/proteins from animal tissues, mammalian cell culture, plants and microorganisms utilizing methods such as salt and solvent fractionation, isoelectric precipitation, two phase separation, ion exchange, adsorption, hydrophobic and affinity chromatography, gel filtration, HPLC, crystallization. Experienced in chemical modification and immobilization of enzymes/proteins. Experienced in enzymes/proteins assays using spectrophotometric, radioisotopic and titrametric, gel electrophoresis, isoelectric focusing, western blot and HPLC methods.

- Trained in biochemistry and biophysics of heme proteins including hemoglobin and b and c types cytochrome. Trained in oxygen and electron transport biochemistry.

- Gained hands-on experience in enzymes/proteins isolation and recovery pilot plant including operation of cell disruption equipment, continuous flow centrifuges such as Alpha-Laval, Westfalia, and Sharple, Rotary Drum Filter, Filter Press and also ultrafiltration/nanofiltration equipment.

- Acquired hands-on experience in plasma fractionation, production of coagulation products and hematology methods.

- Acquired hands-on experience in immunochemistry techniques. Gained hands-on and managerial experience in other areas including microbiological/aseptic techniques, small/large scale bacteria and yeast fermentation, mammalian cell culture (Bioreactors and Roller Bottles), micromanipulation, induction and repression concepts, and recombinant genetics.

- Gained expertise in virus inactivation/ removal process development and validation.

- Acquired expertise in designing processes for manufacturing biologicals with high degree of manufacturability, scalability and cost efficiency.

Work:

1. Eleven years of experience in solving problems, implementing new projects and providing technical support for Baxter's BioScience manufacturing plants. The main responsibilities included providing technical support for the two recombinant Anti-hemophiliac (FVIII) products (Recombinate and Advate) and Alpha 1- Antitrypsin (from plasma). Other accomplishments are the following:

- As the Director of Implementation for new projects managed the process optimization of recombinant human Alpha 1-Antitrypsin (in yeast).

- Optimized, scaled up and transferred recombinant Erythropoietin Omega (Epomax) to a new GMP facility. Designed and managed the building and validation of the new manufacturing facility. Managed the process development, process validation and development of virus

removal steps for this product. Managed the manufacturing plant for three years producing engineering and conformance lots.

- Provided a process optimization plan and strategy for manufacturing recombinant bactericidal/ permeability-increasing protein (Neuprex).
- Participated in examining the feasibility of manufacturing and application of Biosensors for in-line detection and measurement of in-process and final biological products.
- Contributed to the development of a new cell line for manufacturing recombinant anti-CD34 antibody as a component of a product (Isolex) for autologous stem cell treatment of cardiac patients. Provided a strategy for manufacturing other components of the Isolex product.
- Provided a strategy for manufacturing recombinant Factor VIIa (a coagulation factor) as a bio-similar product.
- Managed production of A1PI (plasma) by a contract manufacturer. Resolved the discoloration issue for this product.
- Performed evaluation for alternative Nanofilter for all products of Baxter BioScience.
- Provided leadership and technical expertise for resolving a number of filtration issues for plasma and recombinant products.
- Provided leadership and technical expertise for the Division's Risk Management program.

2. Eleven years of managerial and hands-on experience in Baxter's Blood Substitutes Group. Accomplishments include:

- As a Principle Scientist contributed to and managed the development of chemically modified hemoglobin (as a blood substitute) from human Red Blood Cells.

- Designed, managed and performed over 400 developmental protocols to establish a production process for the modified hemoglobin product.

- Prepared more than 250 pieces of documents, Run Sheets, Standard Operating Procedures, Control Test Procedures and Assay Validation Information.

- Adapted the Good Manufacturing Practices into Production of the modified hemoglobin process in preparation for filing Investigatory New Drug.

- Managed the pilot-scale manufacturing group who produced over 100 lots of the blood substitute product under GMP guidelines for pre-clinical and clinical studies.

- Prepared protocols and participated in validation of the modified hemoglobin (diaspirin cross-linked) production processes, equipment and facilities.

- Participated in the design and the process of building three pilot plants and a commercial manufacturing facility for production of modified hemoglobin.

- Transferred technology to European manufacturing facility for the blood substitute product.

- Designed and managed over 25 protocols related to evaluation and validation of virus removal and inactivation steps, used in the manufacture of the blood substitute product.
- Participated in development of second (with enhanced stability) and third (polymerized modified hemoglobin) generations of blood substitute products.

- As the Director of the Process Development Group designed and managed the studies leading to scale up, process engineering and "First of Code" production in the commercial scale manufacturing plant.

- As a production section team leader contributed in preparation of the IND and PLA for submission of the product.

3. Twelve years of hands-on experience in the development of procedures for isolation and purification of enzymes, biologically significant proteins, glycopeptide hormones and production of enzymatically synthesized coenzyme and substrates. Nine years of managerial experience in designing, initiating research and supervising the scale-up process and production of enzymes used for in-house clinical diagnostics formulation and listed in the Calbiochem- Behring catalog. Accomplishments include:

   - In 1969-1975 time period as a Bench Chemist and later as a Laboratory Supervisor developed and produced enzymes such as alpha-glycerophosphate dehydrogenase, lactate dehydrogenase, pyruvate kinase, triose phosphate isomerase from ex-rabbit muscle, glucose-6-phosphate dehydrogenase, hexokinase, enolase from Saccharomyces cerevisiae, NAD kinase from ex-chicken liver, glutamate-pyruvate transaminase, malate dehydrogenase from ex-porcine heart, alkaline phosphatase from ex-human placenta and cholesterol esterase from ex-porcine pancreas. These enzymes were used for production of various clinical diagnostic reagents.

   - In 1982-1988 time period developed and managed a productive and accomplishment-oriented R&D and production group for Calbiochem-Behring Diagnostics. This group was successful in achieving the organization's objectives with respect to enzymes/proteins production.

     Examples:

     -Produced a cost efficient method for large-scale production of lipase from Rhixopus arrhizus suitable for Behring Diagnostics Triglyceride formulation.

     -Initiated and developed a novel method for production of Lipase from pseudomonas sp, free of proteases and suitable for various Behring Diagnostics Triglyceride reagents.

     -Initiated and completed development for the enzyme maltase from Saccharomyes cerevisiae which is used in alpha-Amylase reagent.

     -Developed a novel purification method for the enzyme alpha-glycerophosphate oxidase from Aerococcus sp.

-Optimized the existing production method for preparation glycerokinase from E. coli with higher degree of purity and 300% increase in final yield.

-Added two-dozen of new, in some cases novel, enzymes/proteins/glycopeptides hormones items to the Calbiochem-Behring biochemical catalog during 1982-1988 time periods.

- As a hands-on researcher produced a cost-efficient procedure for large-scale purification of lysylendopeptidase from Lysobacter enzymogenes that was used for production of semi-synthetic insulin by Hoechst Pharmaceutical.

- Participated in the development of diagnostic reagents based on clinical chemistry and immunochemistry concepts throughout the career at the Calbiochem- Behring organization.

- Developed and renovated the enzymes facilities updating the equipment, and practices suitable for technological and safety requirements of the 1980's.

4. Four years of full-time and three years of part-time experience in teaching Biochemistry, Molecular Enzymology and Industrial Biochemistry courses.

PROFESSIONAL AFFILIATIONS:

American Society for Biochemistry and Molecular Biology
The Biochemical Society: London, UK.

EDUCATION:

B.S. Science and Mathematics, Eastern Oregon University: La Grande, Oregon, 1969.
M.S. Management Science, West Coast University: Los Angeles, California, 1974.
M. Phil., Biochemistry (Transferred to Ph.D. Program), University of Surrey: Guildford, Surrey, UK, 1980.
Ph.D. Biochemistry, University of Surrey: Guildford, Surrey, UK, 1984.

RECENT PATENTS:

M. R. Azari, et al., Preparation of Pharmaceutical Grade Hemoglobins by Heat Treatment in Partially Oxygenate Forms, Patent No. 5,741,894.

BIBLIOGRAPHY

M. R. Azari

PUBLICATIONS:

1. Azari, M.R., Wiseman, A., Solubilization of cytochrome P-450 in high yield from Saccharomyces cerevisiae microsomal membranes by 1% Triton X-100, stabilization effect, (1980), Biochem. Soc. Trans. 8, 713-714.

2. Azari, M.R., Wiseman, A., Error in assay due to time dependency of carbon monoxide difference spectrum of reduced yeast cytochrome P-450: Slow reduction caused by Triton X-100 present, (1981), Anal. Biochem. 117, 706-709.

3. Azari, M.R., Wiseman, A., Studies on the procedures to accurately measure the binding properties of benzo(a)pyrene to cytochrome P-450/P-448, (1982), Biochem. Soc. Trans., 10, 134-135.

4. Azari, M.R., Wiseman, A., Spectral comparisons of benzo(a)pyrene binding to cytochrome P-450/P-448 in microsomal fractions and in highly purified form, (1982), Biochem. Soc. Trans., 10, 135-136.

5. Wiseman, A., Azari M.R., A Study of benzo(a)pyrene binding to microsomal and highly purified cytochrome P-450/P-448 by equilibrium gel filtration, (1982), Biochem. Soc. Trans., 10, 136-137.

6. Azari, M.R., Wiseman, A., Purification and characterization of the cytochrome P-448. Component of a benzo(a)pyrene hydroxylase from Saccharomyces cerevisiae, (1982), Anal. Biochem., 122, 129-138.

7. King, D.J., Azari, M.R., Wiseman, A., Induction of benzo(a)pyrene hydroxylase in Sacharomyces cerevisiae, (1982), Biochem. Biophys. Res. Commun., 105, 115-1121.

8. King, D.J., Azari, M.R., Wiseman, A., Inhibition of highly purified benzo(a)pyrene, hydroxylase from Saccharomyces cerevisiae by cytochrome P-448 binding compounds and by flavonoids, (1982), Biochem, Soc. Trans., 10, 528-529.

9. Azari, M.R., King, D.J., Wiseman, A., Studies on the differences in thermal stability and critical temperature of cytochrome P-448 from saccharomyces cerevisiae in microsomal, solubilized and highly purified form, (1982), Biochem. Soc. Trans., 10, 529-530.

10. Azari, M.R., Wiesman, A., Evaluation of immobilized cytochrome P-448 from Saccharmoyces cerevisiage using permeabilized whole cell, microsomal fraction and highly purified reconstituted forms with benzopyrene-3-monooxygenase activity, (1982), Enzyme Microb. Technol., 4, 401-404.

11. King, D.J., Azari, M.R., Wiseman, A., Studies on the properties oh highly purified cytochrome P-448 and its dependent activity benzo(a)pyrene hydrodroxylase, from Saccharomyces cerevisiae, (1984), Xenobiatica, 14, 187-206.

12. King, D.J., Azari, M.R., Wiseman, A., Characterization of cytochrome P-448 from Saccharomyces cerevisiae, in Cytochrome P-450, Biochemistry, Biophysics and Environment Implications (Julkunen, A. et al eds.) Elsevier/North-Holland Biomedical Press,(1982) 369-372.

13. King, D.J. Azari, M.R., Wiseman, A., Immobilization of a cytochrome P-450 enzyme from Saccharomyces cerevisiae, Methods in Enzymology, volume 137, Academic Press, (1988), 675-686.

14. Ducan, J.D., Wallis, J.O., Azari, M.R., Purification and properties of Aerococcus viridans, Lactate Oxidase, (1989), Biophys. Biochem. Research Communication, 164(2), 919-926.

15. Nelson D.J., Azari, M., Brown, R., Burhop, K., Bush, S., Catarello, J., Chuang, H., Downing, C., Estep, T., Loewen, A., McClure, K., McDaniel, A., Michalek, E., Mozier, N., Rohn, K., Spicuzza, J., Zieske, P., Zimmerman, G., Preparation and characterization of diaspirin crosslinked hemoglobin solutions for preclinical studies, (1992), Biomat., Art. Cells and Immob. Biotech., 20 (2-4), 423-427.

16. Azari, M., Rohn, K., Picken, J., Diaspirin Crosslinked Hemoglobin (DCLHb): characterization of the process and the product manufactured under GMP requirements for clinical studies, (1994), Art. Cells Blood Subs., and Immob. Biotech., 22 (3), 701-708.

17. Azari, M., Catarello, J., Burhop, K., Camacho, T., Ebeling, A., Estep, T., Guzder, S., Krause, K., Marshall, T., Rohn, K., Sarajari, R., Validation of the heat treatment step used in the production of diaspirin crosslinked hemoglobin (DCLHb™) for viral inactivation-effect of crosslinking, **(**1997), Art. Cells Blood Subs., and Immob. Biotech., 25(6) 521-526.

18. Azari, M., Ebeling, A., Baker, R., Burhop, K., Camacho, T., Catarello, J., Estep, T., Guzder, S., Marshall, T., Rohn, K., and Sarajari, R., Validation of the heat treatment step used in the production of diaspirin crosslinked hemoglobin (DCLHb™) for viral inactivation, (1998), Artif Cells Blood Subs Immobil Biotech.,26(5&6), 577-582.

19. Azari, M., Boose J. A., Barhop K. ,Camacho T., Catarello, J., Darling, A., Ebeling, A., Estep, T., Pearson, L., Guzder, S., Herren , J., Lin, L., Marshall, T., Ogle, K., Paine, J., Rohn, K., Sarajari, R., Sun, C.-S., Zhang, L., Evaluation and validation of virus removal by ultrafiltration during the production of diaspirin crosslinked hemoglobin (DCLHb), (2000), Biologicals 28, 81-94.

20. Ogle, K., Azari, M.R., Virus removal by ultrafiltration: A case study with diaspirin crosslinked hemoglobin (DCLHb), in "Membrane Separations in Biotechnology", Second Edition,(2001, Marcel Dekker, NY.

ABSTRACTS:

1. Wiseman, A., Azari, M.R., Isolation and purification of cytochrome P-450 from Saccharomyces cerevisiae: Enzyme applications, (1981), Abstr. 2nd Congr. Eur. Fed. Biotechnol. , 172.

2. Azari, M.R., Wiseman, A., Solubilization of cytochrome P-450 in high yield from Saccharomyces cerevisiae microsomal membranes by 1% Triton X-100; stabilization effect, (1980), Biochem. Soc. Bulletin, 2 (3), 30.

3. Azari, M.R., Wiseman, A., Studies on the procedure to measure accurately the binding properties of benzo(a)pyrene to cytochrome P-450/P448, (1981), Biochem. Soc. Bulletin, 3 (4), 64.

4. Azari, M.R., Wiseman, A., Spectral comparisons of benzo(a)pyrene binding to cytochrome P-450/448 in microsomal fraction and in highly purified form, (1981), Biochem, Soc. Bulletin 3 (4), 64.

5. Wiseman, A., Azari M.R., A study of benzo(a)pyrene binding to microsomal and highly purified cytochrome P-450/P-448 by equilibrium gel filtration, (1981), Biochem, Soc. Bulletin, 3 (4), 65.

6. King, D.J., Azari, M.R., Wiseman, A., Inhibition of highly purified benzo(a)pyrene hydroxylase from Saccharomyces cerevisiae by cytochrome P-448 binding compounds and by flavonoids, (1982), Biochem, Soc. Bulletin 2 (2), 37.

7. Azari, M.R., King, D.J., Wiseman, A., Studies on the differences in thermal stability and critical temperature of cytochrome P-448 from Saccharomyces cerevisiae in microsomal, solubilized and highly purified form, (1982), Biochem. Soc. Bulletin 2 (2), 37.

8. Azari, M.R., King, D.J., Wiseman, A., Spectral binding studies on the interaction of some putative substrate with highly purified cytochrome P-448 from Saccharomyces cerevisiae, (1982), Biochem. Soc. Bulletin 2 (2), 38.

9. King, D.J., Azari, M.R., Wiseman, A., Characterization of cytochrome P-448 rom Saccharomyces cerevisiae, (1982), Abstr. Inter. Conf. Cytochrome P-450, 4th (Julkunen, A. et al eds.) Univ. of Kuopio (Finland) Publication, 41.

10. Nelson, D., Azari, M., Baron, C., Bush, S., Catarello, J., Marshall, T. Spicuzza, J., Zieske, P., Preparation and characterization of diaspirin-crosslinked hemoglobin solutions for preclinical studies, Biomaterials Artificial Cells, and Immobilization Biotechnology,(1991), 19(2), 452.

11. Azari, M., Ebeling, A., Sun, C., New blood product: Diaspirin Crosslinked Hemoglobin as a Blood Substitute, Virus Inactivation and Removal, (1992), Transfusion, 32, 85.

12. Azari, M., Rohn, K., Picken, J., Diaspirin Crosslinked Hemoglobin (DCLHb™): Characterization of the process and the product manufactured under GMP requirements for clinical studies, (1993), Abstr. Vth Inter Symp. on Blood Substitutes.

13. Azari, M., Catarello, J., Burhop, K., Camacho, T., Ebeling, A., Estep, T., Guzder, S., Krause, K., Marshall, T., Rohn, K., Sarajari, R., Validation of the heat treatment step used in the production of diaspirin crosslinked hemoglobin (DCLHb™) for viral inactivation-effect of crosslinking. Artif Cells Blood Subs Immobil Biotech, (1996), 24(4),303.

14. Azari, M., Ebeling, A., Baker, R., Burhop, K., Camacho, T., Catarello, J., Estep, T., Guzder, S., Marshall, T., Rohn, K., Sarajari, R., Validation of the heat treatment step used in the production of diaspirin crosslinked hemoglobin (DCLHb™) for viral inactivation. Artif Cells Blood Subs Immobil Biotech, (1996), 24(4), 304.

15. Nelson, D. J., Azari, M., Moore, E., Estep, T., Picken, J., Rohn, K., DCLHb, A Hemoglobin-Based Oxygen Carrier: Manufacture and Characterization for use in Clinical Studies, VII International Symposium on Blood Substitutes (7-ISBS), (1997), Abstract 3B-04.

16. Azari, M., Ebeling, A., Ogle, K., Guzder, S., Catarello, J., Paine J., Camacho T., Sarajari R., Herren, J., Estep, T., Rohn, K., Marshall, T., Burhop, K., A Strategy for Validation of Ultrafiltration for Virus Removal: Points to Consider, VII International Symposium on Blood Substitutes (7-ISBS), (1997), Abstract P06-c.

17. Azari, M., Ebeling, A., Catarello, J., Burhop, K., Camacho, T., Estep, T., Guzder, S., Marshall, T., Rohn, K., Sarajari, R., Boose, J.A., Horner, R., Lu, L., Peasron, L., Validation of Virus Inactivation during the Crosslinking and Heat Treatment Steps used in the Production of Diaspirin Crosslinked Hemoglobin (DCLHb), VII International Symposium on Blood Substitutes (7-ISBS), (1997), Abstract P07-c.