

CURRICULUM VITAE: LINDA Owers NARHI

EDUCATION:

Ph.D., Biological Chemistry, Dept. of Biological Chemistry, University of California, Los Angeles. September, 1984. Thesis: "The purification and characterization of the barbiturate-inducible cytochrome P-450 proteins of *Bacillus megaterium*".

B.S. (Chemistry) Chemistry, and BS Cellular and Molecular Biology. Honors College, University of Michigan, Ann Arbor, Michigan. December 1978.

Professional activities:

USP (United States Pharmacopeia) Member of Dosage form expert committee, 2020-2025

Chair subvisible particle expert panel, 2020-2025

Member visual inspection, injectables, and devices expert panels 2020-2025

Member of subvisible particle expert panel 2010-2020: <787>, <1787>, <1788>,

Vice-chair stakeholders forum, 2021-2022

Participated in exploratory workshops on Higher order structure, non-product specific monographs, at line analytics., and CGT

Gordon Research Conference: Co-Vice Chair 2019 Gordon Research Conference on Biotherapeutic and vaccine development (First GRC on this subject, and with equal representation from academia and industry.

Co-chair 2022 conference on same topic, March 2022 in Ventura

AAPS (American Association of Pharmaceutical Scientists): organizing conferences, moderating multiple sessions and numerous presentations and webinar

Chair for focus group on Protein Aggregation and biological consequences, 2016-2018, Steering committee member 2008-2015,

Leading group efforts on multi-year cross lab experiments on generation of aggregates and characterization of physical properties, in vitro activity, and in vivo activity and resulting white papers

CASSS (California association of separation scientists) : Associate Director, 2015-2019, organizing committee for Higher Order structure meeting and for WCBP, Chair of HOS 2014, 2015 meeting

IQ (Innovation & Quality) consortium

- on CMC biologics leadership group 2016-2019(original member of this LG)
- Initiated and participated in study on sub micron particles in clinical and commercial products resulting in cross-industry publication
- Initiated and participating in white paper on biological effect of silico oil droplets in marketed biologics
- Member of ETC analytic leadership group, leading team exploring commercial automated visible particle analytical (particle size distribution and characterization) instrumentation 2020-2022

Educational outreach

- 2022 Bioengineering institute of California Industrial Liaison Committee
- 2020: Developing program at Casa Pacifica (foster children of Ventura and Santa Barbara county) for hands on science in classroom with scientists as mentor (suspended during COVID)

- 2018-present: Industrial Advisory Board for UCLA Bioengineering department (co-chair 2018-2022)
- 2016: Adjunct Professor , Univ California Santa Barbara, Dept of Molecular, cellular and developmental biology
Co-instructor for Pharmacology/physiology lab in MCDB department, fall 2020, 2021
- Lead for Amgen postdoctoral program in Process Development from program start until 2018
- Process Development lead for educational outreach efforts for Amgen with UCLA, USC, UCSB, CalTech, participate in work with Stanford and MIT including workshops and invited lectures, 2010-2018
- Workshops through Brighter Horizons (AAUW) and local elementary and middle schools

Editorial Board member J. Biological Chemistry, 3rd term 2015-2022

Editorial Board member J. Pharm. Sci, 2008 -present

Employment history

2019-2022: Consultant for Genentech/Roche, Global Particle expert and Industry Benchmarking,
2018-present Consultant with Denali (particles),
Scientific advisory board for Don't Forget Morgan (BPAN parent advocacy research funding organization)

2018 to 2019: Consultant for Amgen on Protein aggregation, particles, Biological relevance of critical quality attributes, and strategic external engagement

2014-2018: Scientific Executive Director, Process Development

Leading cross functional technology development efforts for the Process Development organization at Amgen (just under 1000 people), and external engagement for this function. This group is accountable for product and process development and characterization (including all analytical assays) from lead candidate selection through commercialization and beyond. Responsibilities included coordinating external academic collaborations and academic engagements, leading the PD postdoc program, coordinating cross functional technology development efforts to reach long term technology goals, and communication of progress towards these (including annual Innovation Summit)

2011-2014: Scientific Executive Director, Product Attribute Science.

Leader of Technology Forum Leadership Team, and technology development for Process and Product development. Responsible for solution stability aspects of Molecule Assessment, across all modalities, developing and implementing predictive assays for stability to process, storage and delivery conditions for product development, including changes in chemical modification, higher order structure, and aggregation. Also led team developing and implementing assays to assess biological consequences of product quality attributes, especially protein aggregates. Co-lead of cross functional Immunogenicity Team, developing, adapting and implementing methods to assess relative immunogenic potential for protein aggregates and other quality attributes. Co-lead of cross functional Ab engineering team.

- 2008-2011: Scientific Executive Director, Formulation and Analytical Resources
 Led diverse group of more than 20 scientists, responsible for formulation and process aspects of selection of protein candidate with stability to process, storage and delivery conditions. Also responsible for providing biophysical characterization (analysis of higher order structure) support throughout product lifecycle. Scientific leader responsible for developing scientific strategy to address particles, etc. for the Process and Product Development organization
- 2006-2008: Scientific Director, Forensics and Biophysical Analysis
 Process and Analytical Sciences,
 Lead diverse cross site group of as many as 43 scientists responsible for identification of particles in support of clinical and commercial products, for leachables extractables, and for mass spectra-based analytics. Also responsible for providing biophysical characterization support throughout product lifecycle including authoring parts of CMC section for filing ,for all Amgen products.
- 2002-2006: Senior principal Scientist and Team leader of Biophysical Characterization team
 Analytical Sciences
- 1998-2002: Research Scientist V, Analytical Research and Development Dept.
 Responsible for expanding capability to analyze protein structure and stability, especially in solutions, and supporting all filings.
- 1986-1998 Research Scientist I, II, III, Protein Chemistry Dept., Amgen, Inc. Thousand Oaks, California.
 Responsible for purification of both recombinant and native proteins from various sources. Also responsible for the characterization of the solution structure and stability of proteins, supporting all R&D
- 1984-1986: Postdoctoral Fellow with Armand Fulco, Dept. of Biological Chemistry, University of California, Los Angeles. Characterization of three cytochrome P-450 proteins of Bacillus megaterium, especially P450 BM-3. Included determining enzyme kinetics and cofactor requirements.
- 1979-1984: Graduate student with Armand Fulco in the Department of Biological Chemistry, UCLA. Induction, Purification and preliminary characterization of cytochrome P-450s in Bacillus megaterium.
- 1978-1979: Research Associate with C.A.E. Laemmli in Department of Anatomy, UCLA.
- 1986-1978: Undergraduate student in lab of Dr. K.M.J. Mennon at University of Michigan.

EXTERNAL AWARDS:

2020 AIMBE Fellow
 2019 AAPS Fellow

2021 AAPS Journal highest impact paper
 2015 Ebert Award for best publication in J. Pharm Sci
 2010, Award for best publication in PDA Journal

1984-1986 NIH Postdoctoral Fellowship
 1979-1984 NIH Predoctoral Training Grant
 1975 National Merit Finalist, and University of Michigan Regents Scholars

Patents:

Stable effector functionless FC and IgG proteins, Gunan Kanna et al, 2013
Keratinocyte growth factor-2 products, Narhi, Linda Owers; Osslund, Timothy David, 2004
Anti-inflammatory CD14 peptides, Lichenstein, H. S.; Wright, S. D.; Narhi, L. O.; Juan, S-C. 1998.
Multiply mutated subtilisins, Zukowski, M. M.; Narhi, L. O.; Levitt, M 1995

Publications:**Book editor:**

1. *Biophysics for therapeutic protein development*. Vol 4 in the series Biophysics for the Lifesciences, (2013) Linda O. Narhi ed, New York: Springer, NY NY
2. *Molecular Biophysics for the Lifesciences*, Vol 6 in the series Biophysics for the Lifesciences, Allewell, Norma M., Narhi, Linda O., and Rayment, Ivan, eds 2013, Springer, NY NY

Book chapters:

1. Linda O. Narhi, Cynthia Li, Ranjini Ramachander, and Yijia Jiang, Spectroscopic methods for Macromolecular analysis, in *Biophysics for the Life Sciences*, (2013) Norma Allewell, Ivan Rayment, and Linda O Narhi, editors.
2. Narhi, L.; Jiang, Y.; Deshpande, R.; Kang, S. and Shultz, J. "Approaches to Control Protein Aggregation during Bulk Production" in *Aggregation of Therapeutic Proteins*, **2010**, eds. Wang, W. and Roberts, C.,
3. Cao, S.; Narhi, L. O.; Jiang Y. and Rajan, R. S. "Analytical Methods to Measure Sub-visible Particulates" in *Analysis of Aggregates and Particles in Protein Pharmaceuticals*. **2009**, eds. Mahler, H.-C. and Jiskoot, W.
4. Ricci, Margaret Speed; Pallitto, Monica M.; Narhi, Linda Owers; Boone, Thomas; Brems, David N. "Mutational approach to improve physical stability of protein therapeutics susceptible to aggregation - Role of altered conformation in irreversible precipitation" in *Misbehaving Proteins: Protein (Mis)Folding, Aggregation, and Stability*. 2006. 331-350. eds. Murphy, RM, Tsai, AM.
5. Citron, Martin; Narhi, Linda; Wypych, Jette; Louis, Jean-Claude; Biere, Anja Leona. "alpha-synuclein fibrillogenesis as target for drug development" in *Neuroscientific basis of dementia*. 2001. 143-149.
Eds: Tanaka, Chikako, McGeer, Patrick L., and Ihara, Yasuo.
6. Lu, Hsieng S.; Clogston, Christi L.; Merewether, Lee Ann; Narhi, Linda O.; Boone, Thomas C.. Role of disulfide bonds in folding of recombinant human granulocyte colony stimulating factor produced in *Escherichia coli*" in *ACS Symposium Series Vol. 256; Protein folding: In vivo and In vitro*. 1993. 189-202. Ed.: Cleland, J.L.
7. Arakawa, T.; Kita, Y.A.; Narhi, L.O., "Protein-Ligand interactions as a method to study surface properties of proteins" In *Methods of Biochemical Analysis*, Vol. 35 Protein Structure Determinations. 1991. 87-126. Ed.: Suelter, C.H.

Articles:

1. Linda O. Narhi, Danny K. Chou, Twinkle. R. Christian, Scott Gibson, Bharat Jagannathan, Wim Jiskoot, Susan Jordan, Alavattam Sreedhara, Lloyd Waxman, Tapan K. Das (2022), <https://doi.org/10.1016/j.xphs.2022.01.011>

2. Tapan K. Das, Alavattam Sreedhara, James D. Colandene, Danny K. Chou, Vasco Filipe, Christoph Grapentin, Jim Searles, Twinkle R. Christian, Linda O. Narhi, Wim Jiskoot (2021), <https://doi.org/10.1016/j.xphs.2021.09.030>
3. Mario Hubert, Dennis T Yang, Stanley C Kwok, Anacelia Rios, Tapa Das, Ankit Patel, Klaus Wuchner, Valentyn Antochshuk, Friederike Junge, George M Bou-Assaf, Shawn Cao, Miguel Saggi, Luis Motrono, Natalia Afonina, Parag Kolhe, Vakhtang Loladze, Linda Narhi (2020) *J Pharm Sci* 2020 109, 830-844
4. Nancy Jiao, Gregory V Barnett, Twinkle R Christian, Linda O Narhi, Nathan H Joh, Marisa K Joubert, Shawn Cao (2020), *J Pharm Sci* 109, 640-645
5. Nathan H Joh, Lisa Thomas, Twinkle R Christian, Nancy Jiao, Nilo Allotta, Vibha Jawa, Shawn Cao, Linda O Narhi, Marisa Joubert, (2020) *J Pharm Sci* 109, 845-853
6. Tapan K Das, Linda O Narhi, Alavattam Sreedhara, Tim Menzen, Christoph Grapentin, Danny K Chou, Valentyn Antochshuk, Vasco Filipe, (2020) *J Pharm Sci*, 109, 116-133
7. Roman Mathaes, Linda Narhi, Andrea Hawe, Anja Matter, Karoline Bechtold-Peters, Sophia Kenrick Sambit Kar, Olga Laskina, John Carpenter, Richard Cavicchi, Ellen Koepf, Neil Lewis, Dean Ripple (2019) *AAPS Journal*, D-19-00135R1
8. JinJiang Li, Mary E Krause, Xiaodong Chen, Yuan Cheng, Weiguo Dai, John J Hill, Min Huang, Susan Jordan, Daniel LaCasse, Linda Narhi, Evgenyi Shalaev, Ian C Shieh, Justin C Thomas, Raymond Tu, Songyan Zheng, Lily Zhu (2019) *AAPS J* 21:44
9. Andrew Spasoff, Adrian Bennis, Susanne Atkinson, Cathal Elliott, Erwin Freund, Linda Narhi (2018) *J Pharm Sci* 107 2306-2309
10. Yves Aubin, Michael D Brenowitz, Edward Chess, Thomas Laue, Jasper Lin, Donald MacLean, John P Marino, Linda Narhi, William F Weiss IV, Qin Zou (2017) *Pharm Forum* 43(8)
11. Linda O. Narhi, Quanzhou Luo, Jette Wypych, Riccardo Torosantucci, Andrea Hawe, Kiyoshi Fujimori, Yasser Nashed-Samuel, Vibha Jawa, Marisa K. Joubert, Wim Jiskoot. *Pharm Res* (2017). <https://doi.org/10.1007/s11095-017-2262-8>
12. Frederick W. Jacobsen, Riki Stevenson, Cynthia Li, Hossein Salimi-Moosavi, Ling Liu, Jie Wen, Quanzhou Luo, Kristine Daris, Lynette Buck, Sterling Miller, Shu-Yin Ho, Wei Wang, Qing Chen, Kenneth Walker, Jette Wypych, Linda Narhi, and Kannan Gunasekaran, (2017) *J Biol Chem* 292, NO. 5, pp. 1865–1875,
13. Ling Liu, Frederick W. Jacobsen, Nancy Everds, Yao Zhuang, Yan Bin Yu, Nianyu Li, Darcey Clark, Mai Phuong Nguyen, Madeline Fort, Padma Narayanan, Kei Kim, Riki Stevenson, Linda Narhi, Kannan Gunasekaran, and Jeanine L. Bussiere, (2017) *J Biol Chem* 292, pp. 1876–1883.
14. Marisa K. Joubert, Meghana Deshpande, Jane Yang, Helen Reynolds, Christine Bryson, Mark Fogg, Matthew P. Baker, Jonathan Herskovitz, Theresa J. Goletz, Lei Zhou, Michael Moxness, Gregory C. Flynn, Linda O. Narhi, Vibha Jawa (2016) *PLoS ONE* 11(8):e0159328. doi:10.1371/journal.pone.0159328
15. Jiskoot W, Kijanka G, Randolph T, Carpenter JF, Koulov AV, Mahler H-C, Joubert MK, Jawa V, Narhi LO. *J Pharm Sci* 105 (2016)1567-1575
16. Moussa EM, Panchal JP, Balakrishnan SM, Blum JS, Joubert MK, Narhi LO, Topp EM. *J Pharm Sci* (2016) (DOI: 10.1016/j.xphs.2015.11.002)
17. Vincent Corvari, Linda O. Narhi, Thomas M. Spitznagel, Nataliya Afonina, Shawn Cao, Patricia Cash, Irene Cecchini, Michael R. DeFelippis, Patrick Garidel, Andrea Herre, Atanas V. Koulov, Tony Lubiniecki, Hanns-Christian Mahler, Paolo Mangiagalli, Douglas Nesta, Bernardo Perez-Ramirez, Alla Polozova, Mara Ross, Roland Schmidt, Robert Simler, Satish Singh, Andrew Weiskopf, Klaus Wuchner *Biologicals* (2015) <http://dx.doi.org/10.1016/j.biologicals.2015.07.011>
18. Linda O. Narhi, Vincent Corvari, Dean C. Ripple, Nataliya Afonina, Irene Cecchini, Michael R. DeFelippis, Patrick Garidel, Andrea Herre, Atanas V. Koulov, Tony Lubiniecki⁸, Hanns-Christian

- Mahler, Paolo Mangiagalli, Douglas Nesta, Bernardo Perez-Ramirez, Alla Polozova, Mara Rossi, Roland Schmidt, Robert Simler, Satish Singh, Thomas M. Spitznagel, Andrew Weiskopf, Klaus Wuchner,(2015) *J Pharm Sci*, DOI 10.1002/jps.24437
19. Telikepalli S ,Shinogle HE, Thapa PS, Kim JA, Deshpande M, Jawa V, Middaugh CR, Narhi LO, Joubert MK, Volkin DB. *J Pharm Sci* (2015)DOI 10.1002/jps. 24379
 20. Bi V, Jawa V, Joubert MK, Kaliyaperumal A, Eakin C, Richmond K, Pan O, Sun J, Hokom M, Goletz TJ, Wypych J, Zhou L, Kerwin BA, Narhi LO, and Arora T. *J Pharm Sci* 2013; Vol 102 (10):3545-55.
 21. Joubert, M.K., Hokom M, Eakin C., Zhou, .: Deshpande, R., Baker, M.P. ,Goletz, T.J., Kerwin, B.A. Chirmule, N., Narhi‡ L.O., and Jawa V. (2012) *J. Biol. Chem.*, 287, 25266-25279
 22. [Li CH](#), [Narhi LO](#), [Wen J](#), [Dimitrova M](#), [Wen ZQ](#), [Li J](#), [Pollastrini J](#), [Nguyen X](#), [Tsuruda T](#), [Jiang Y](#) 2012 [Biochemistry](#). 18;51(50):10056-65..
 23. Narhi, Linda O., Schmit, J., Bechtold-Peters, K., Sharma, D., (2012) *J. Pharm. Sci.* 101, 493-498.
 24. Luo, Q., Joubert M.K., Stevenson, R., Ketchem, R.R., Narhi, L.O. and Wypych, J. 2011, *J. Biol. Chem* 286, 2534-25144
 25. Joubert, M.K., Luo Q, Nashed-Samuel, Y., , Wypych, J., and Narhi, L.O. 2011 *J.Biol. Chem.*, 286, 25118-25133.
 26. Jiang, Y., Li., C.H., Nguym, X., Towers, E., Muzammi, S., Gabrielson, J., and Narhi, L.O. (2011) \ *J. Pharm.. Sci DOI 10.1002/jps.22686*
 27. Li, C.H., Nguyen, X., Narhi, L.O., Chemmalil, L., Towers, E., Muzammil, S., Gabrielson, J., and Jiang, Y (2011) *j. Pharm. Sci*, DOI 10.1002 /jps.22695
 28. Singh, Satish K. ; Afonina, Nataliya; Awwad, Michel; Bechtold-Peters, Karoline; Blue, Jeffrey T.; Chou, Danny; Cromwell, Mary ; Krause, Hans-Juergen ; Mahler, Hanns-Christian; Meyer, Brian K.; Narhi, Linda; Nesta, Doug P.; Spitznagel, Thomas (2010) *J. Pharm. Sci.* 3302-3321
 29. He, F.; Phan, D. H.; Hogan, S.; Bailey, R.; Becker, G. W.; Narhi, L.O.; Razinkov, V.I. 2010 *J Pharm. Sci.* 99, 2598-2608
 30. He , F.; Becker, G.W.; Litowski J.R.; Narhi, L.O.; Brems D.N; Razinkov, V.I; 2010, *Analytical Biochemistry* 399 141–143
 31. He, F.; Hogan, S.;Latypov, R.F.;Narhi, L.O.; and Razinkov, V.I., 2010 *J. Pharm. Sci.* 99, 1707-1720.
 32. Cao, S.; Jiang Y. and Narhi, L. *US Pharmacoepial Forum*, **2010**, PF 36 (3) May-June.
 33. Cao, S.; Jiao, N.; Jiang, Y.; Mire-Sluis, A. and Narhi, L.O. *Pharmeuropa Bio & Scientific Notes*, **2010**, 2009-1, 73-79.
 34. Narhi, L.; Jiang, Y.; Cao, S.; Benedek, K. and Shnek, D. *Current Pharmaceutical Biotechnology*, 2009, Vol. 10, No. 4., pp. 373-381
 35. Jiang, Y.; Nashed-Samuel, Y.; Li, C.; Liu, W.; Pollastrini, J.; Mallard, D.; Wen, Z.-Q.; Fujimori, K.; Pallitto, M.; Donahue, L.; Chu, G.; Torraca, G.; Vance, A.; Mire-Sluis, A.; Freund, E.; Davis J. and Narhi, L. *Journal of Pharmaceutical Sciences*, **2009**, DOI 10.1002/jps (Jul. 30)
 36. Deechongkit, S.; Wen, J.; Narhi, L.; Jiang, Y.; Park, S.; Kim, J. and Kerwin, B.K. *Journal of Pharmaceutical Sciences*, **2009**, 98(9):3200-17
 37. Liu, W.; Swift, R.; Torraca, G.; Nashed-Samuel, Y.; Wen, Z.-Q.; Jiang, Y.; Vance, A.; Mire-Sluis, A.; Freund, E.; Davis, J. and Narhi, L. *PDA Journal of Pharmaceutical Science & Technology*, **2010**, **64**, 11-19
 38. Saluja A, Crampton S, Kras E, Fesinmeyer RM, Remmele RL Jr, Narhi LO, Brems DN, Gokarn YR.. *Pharm Res.* 2009 Jan;26(1):152-60.

39. Gokarn YR, Fesinmeyer RM, Saluja A, Cao S, Dankberg J, Goetze A, Remmele RL Jr, Narhi LO, Brems DN. *Protein Sci.* 2009 Jan;18(1):169-79.
40. Fesinmeyer RM, Hogan S, Saluja A, Brych SR, Kras E, Narhi LO, Brems DN, Gokarn YR. *Pharm Res.* 2008 Dec 23.
41. Wen, J.; Jiang, Y.; and Narhi, L.. *Journal of American Pharmaceutical Review* (**2008**), 11 (6), 98-104
42. Ramachander, R.; Jiang, Y.; Li, C.; Tamer Eris, Young M.; Dimitrova, M. and L. Narhi,. *Analytical Biochemistry*, 376 (**2008**), 173-182
43. Jiang, J.; Li, C.; Ramachander, R.; Wen, J. and Narhi, L.O. *Journal of American Pharmaceutical Review*, **2008**, February (online issue).
44. Wen, J.; Jiang, Y.; Hymes, K.; Gong, K., and Narhi, L *MicroCal Application Note*, Oct., **2007**
45. Wen, J.; Jiang, Y. and Narhi, L. *Journal of American Pharmaceutical Review*, Volume 10, Issue 6, pp. 10 -15, **2007**.
46. Wen, J.; Jiang, Y.; Hymes, K.; Gong, K.; Narhi, L. *MicroCal Application Note*, October, 2007.
47. Hsu, Eric; Osslund, Timothy; Nybo, Rebecca; Chen, Bao-Lu; Kenney, William C.; Morris, C. Fred; Arakawa, Tsutomu; Narhi, Linda O. *Protein Engineering Design & Selection*. 19(4). APR 2006. 147-153.
48. Jiang, Y. and Narhi, L.O. *Am. Pharm. Rev.* July/August, 2006
49. Krishnan, Sampathkumar; Chi, Eva Y.; Wood, Stephen J.; Kendrick, Brent S.; Li, Cynthia; Garzon-Rodriguez, William; Wypych, Jette; Randolph, Theodore W.; Narhi, Linda O.; Biere, Anja Leona; Citron, Martin; Carpenter, John F.J..*Biochemistry*. 42(3). January 28, 2003. 829-837.
50. Arakawa T. Li T. Narhi L.O. *Pharmaceutical Biotechnology*. 13:27-60, 2002
51. Li, Tiansheng; Yamane, Harvey; Arakawa, Tsutomu; Narhi, Linda O.; Philo, John. *Protein Engineering*. 15(1). January, 2002. 59-64.
52. Markell, David; Hui, John; Narhi, Linda; Lau, David; LeBel, Carl; Aparisio, Diane; Lile, Jack; Jing, S; Yui, Darren; Chang, Byeong S.. *Pharmaceutical Research* (New York). 18(9). September, 2001. 1361-1366.
53. Narhi, Linda O.; Arakawa, Tsutomu; Aoki, Kenneth; Wen, Jie; Elliott, Steve; Boone, Thomas; Cheetham, Janet. *Protein Engineering*. 14(2). February, 2001. 135-140.
54. Callahan, W. J.; Narhi, L. O.; Kosky, A. A.; Treuheit, M. J. *Pharmaceutical Research*. 18(3):261-6, 2001 Mar.
55. Biere, Anja Leona; Wood, Stephen J.; Wypych, Jette; Steavenson, Shirley; Jiang, Yijia; Anafi, Dan; Jacobsen, Frederick W.; Jarosinski, Mark A.; Wu, Gay-May; Louis, Jean-Claude; Martin, Francis; Narhi, Linda O.; Citron, Martin: *Journal of Biological Chemistry*. 275(44). November 3, 2000. 34574-34579.
56. Danilenko D.N.; Montestruque S.; Philo J.S.; Li T.S.; Hill D.; Speakman J.; Bahru M.; Zhang M.S.; Konishi O.; Itoh N.; Chirica M.; Delaney J.; Hernday N.; Martin F.; Hara S.; Talvenheimo J.; Narhi L.O.; Arakawa T. *Archives of Biochemistry & Biophysics*. 361(1):34-46, 1999 Jan 1.
57. Narhi, Linda O.; Philo, John S.; Sun, Bin Chang.; Byeong S.; Arakawa, Tsutomu.. *Pharmaceutical Research* . 16(6). June, 1999. 799-807.

58. Moellering, Bill J.; Yoshinaga, Steven K.]; Hui, Ariela; Delaney, John M.; Hara, Shinichi; Narhi, Linda O. ; Westcott, Keith R. *Protein Expression & Purification*. 16(1). June, 1999. 160-170.
59. Caughey, Dorothy J.; Narhi, Linda O.; Kita, Yoshiko; Meng, Shi-Yuan; Wen, Duanzhi; Chen, Wen; Ratzkin, Barry J.; Fujimoto, Jiro; Iwahara, Toshinori; Yamamoto, Tadashio; Arakawa, Tsutomu. *Journal of Chromatography B*. 728(1). May 14, 1999. 49-57.
60. Narhi, Linda; Wood, Stephen J.; Steavenson, Shirley; Jiang, Yijia; Wu, Gay May; Anafi, Dan; Kaufman, Stephen A.; Martin, Francis; Sitney, Karen; Denis, Paul; Louis, Jean-Claude; Wypych, Jette; Biere, Anja Leona; Citron, Martin.. *Journal of Biological Chemistry*. 274(14). April 2, 1999. 9843-9846.
61. Lu, Hsieng S.; Fausset, Patricia R; Narhi, Linda O.; Horan, Thomas; Shinagawa, Kyoko; Shimamoto, Grant; Boone, Thomas C. *Archives of Biochemistry & Biophysics*. 362(1). Feb. 1, 1999. 1-11.
62. Li, Tiansheng; Narhi, Linda O.; Wen, Jie; Philo, John S.; Sitney, Karen; Inoue, Jun-Ichiro; Yamamoto, Tadashi; Arakawa, Tsutomu. *Journal of Protein Chemistry*. 17(8). Nov., 1998. 757-763.
63. Osslund, Timothy D.; Syed, Rashid; Singer, Elizabeth; Hsu, Eric W.-J.; Nybo, Rebecca; Chen, Bao-Lu; Harvey, Timothy; Arakawa, Tsutomu; Narhi, Linda Owers; Chirino, Arthur; Morris, Charles F.. *Protein Science*. 7(8). Aug., 1998. 1681-1690.
64. Hamburger, James B.; Chen, Eileen; Narhi, Linda O.; Wu, Gay-May; Brems, David N.. *Proteins*. 32(4). Sept. 1, 1998. 495-503.
65. Narhi, Linda O.; Wypych, Jette; Li, Tiansheng; Langley, Keith E.; Arakawa, Tsutomu *Journal of Protein Chemistry*. 17(5). July, 1998. 387-396
66. Liu, Jennifer L.; Lu, Kan V.; Eris, Tamer; Katta, Viswanatham; Westcott, Keith R.; Narhi, Linda O.; Lu, Hsieng S *Pharmaceutical Research (New York)*. 15(4). April, 1998. 632-640.
67. Rosenfeld R.D.; Zeni L.; Welcher A.A.; Narhi L.O.; Hale C.; Marasco J.; Delaney J.; Gleason T.; Philo J.S.; Katta V.; Hui J.; Baumgartner J.; Graham M.; Stark K.L.; Karbon W. *Biochemistry*. 37(46):16041-16052, 1998 Nov 17.
68. Narhi, Linda O.; Caughey, D. J.; Horan, Thomas P.; Kita, Yoshiko; Chang, David; Arakawa, Tsutomu.. *Analytical Biochemistry*. 253(2). Nov. 15, 1997. 246-252.
69. Narhi, Linda O.; Caughey, D. J.; Horan, Thomas; Kita, Yoshiko; Chang, David; Arakawa, Tsutomu.. *Analytical Biochemistry*. 253(2). Nov. 15, 1997. 236-245.
70. Kolvenbach, Carl G.; Narhi, Linda O.; Philo, John S.; Li, Tiansheng; Zhang, Mei; Arakawa, Tsutomu. *Journal of Peptide Research*. 50(4). 1997. 310-318.
71. Narhi, Linda O.; Rosenfeld, Robert; Shimamoto, Grant; Lee, Richard; Hawkins, Nessa; Li, Tiansheng; Philo, John; Wen, Jie; Arakawa, Tsutomu. *Journal of Peptide Research*. 50(4). 1997. 300-309.
72. Rosenfeld, Robert D.; Miller, James A.; Narhi, Linda O.; Hawkins, Nessa; Katta, Viswanatham; Lauren, Scott; Weiss, Michael A.; Arakawa, Tsutomu. *Archives of Biochemistry & Biophysics*. 342(2). 1997. 298-305.
73. Narhi, Linda Owers; Aoki, Kenneth H.; Philo, John S.; Arakawa, Tsutomu.. *Journal of Protein Chemistry*. 16(3). 1997. 213-225.
74. Hsu, Yueh-Rong; Wu, Gay-May; Mendiaz, Elizabeth A.; Syed, Rashid; Wypych, Jette; Toso, Robert; Mann, Michael B.; Boone, Thomas C.; Narhi, Linda O.; Lu, Hsieng S.; Langley, Keith E. *Journal of Biological Chemistry*. 272(10). 1997. 6406-6415.

75. Arakawa, T.; Li, T.; Philo, J. S.; Narhi, L. O.; Horan, T. P.; Osslund, T. D. *EOS-Rivista di Immunologia ed Immunofarmacologia*. 16(2). 1996. 35-40.
76. Chang, Byeong S.; Beauvais, Robert M.; Arakawa, Tsutomu; Narhi, Linda O.; Dong, Aichun; Aparisio, Diane I.; Carpenter, John F.. *Biophysical Journal*. 71(6). 1996. 3399-3406.
77. Lu, Hsieng S.; Hsu, Yueh-Rong; Narhi, Linda O.; Karkare, Subhash; Lin, Fu-Kuen *Protein Expression & Purification*. 8(2). 1996. 227-237.
78. Narhi, Linda Owers; Philo, John S.; Li, Tiansheng; Zhang, Mei; Samal, Babru; Arakawa, Tsutomu. *Biochemistry*. 35(35). 1996. 11454-11460.
79. Narhi, Linda Owers; Philo, John S.; Li, Tiansheng; Zhang, Mei; Samal, Babru; Arakawa, Tsutomu. *Biochemistry*. 35(35). 1996. 11447-11453.
80. Hsu, Yueh-Rong; Narhi, Linda O.; Spahr, Christopher; Langley, Keith E.; Lu, Hsieng S. *Protein Science*. 5(6). 1996. 1165-1173.
81. Hua, Qing-Xin; Narhi, Linda; Jia, Wenhua; Arakawa, Tsutomu; Rosenfled, Robert; Hawkins, Nessa; Miller, James A.; Weiss, Michael A.. *Journal of Molecular Biology*. 259(2). 1996.
82. Lu, Hsieng S.; Jones, Michael D.; Shieh, Jae-Hung; Mendiaz, Elizabeth A.; Feng, Daphne; Watler, Peter; Narhi, Linda O.; Langley, Keith E. *Journal of Biological Chemistry*. 271(19). 1996. 11309-11316.
83. Jones, Michael D.; Narhi, Linda O.; Chang, Wen-Chang; Lu, Hsieng S. *Journal of Biological Chemistry*. 271(19). 1996. 11301-11308.
84. Horan, Tom; Wen, Jie; Narhi, Linda; Parker, Vann; Garcia, Andy; Arakawa, Tsutomu; Philo, John. *Biochemistry*. 35(15). 1996. 4886-4896.
85. Philo, John S.; Aoki, Kenneth H.; Arakawa, Tsutomu; Narhi, Linda Owers; Wen, Jie. *Biochemistry*. 35(5). 1996. 1681-1691.
86. Arakawa, Tsutomu; Holst, Paige; Narhi, Linda O.; Philo, John S.; Wen, Jie; Prestrelski, Steven J.; Zhu, Xiaotian; Rees, Douglas C.; Fox, Gary M.. *Journal of Protein Chemistry*. 14(5). 1995. 263-274.
87. Juan, Todd S.-C.; Hailman, Eric; Kelley, Michael J.; Busse, Leigh A.; Davy, Elyse; Empig, Cyril J.; Narhi, Linda O.; Wright, Samuel D.; Lichenstine, Henri S.. *Journal of Biological Chemistry*. 270(10). 1995. 5219-5224.
88. McGinley, Michael D.; Narhi, Linda O.; Kelley, Michael J.; Davy, Elyse; Robinson, John; Rohde, Michael F.; Wright, Samuel D.; Lichenstein, Henri S. CD14. *Journal of Biological Chemistry*. 270(10). 1995. 5213-5218.
89. Lu, Hsieng S.; Chang, David; Philo, John S.; Zhang, Ke; Narhi, Linda O.; Liu, Naili; Zhang, Mei; Sun, Jilin; Wen, Jie; Yanagihara, Donna; Karunagaran, Devarajan; Yarden, Yosef; Ratzkin, Barry *Journal of Biological Chemistry*. 270(9). 1995. 4784-4791.
90. Arakawa, Tsutomu; Horan, Thomas P.; Leong, Kahan; Prestrelski, Steven J.; Narhi, Linda O.; Hu, Sylvia *Archives of Biochemistry & Biophysics*. 316(1). 1995. 285-289.
91. Samal, Babru B.; Arakawa, Tsutomu; Boone, Thomas C.; Jones, Theodore; Prestrelski, Steve J.; Narhi, Linda O.; Wen, Ji; Stearns, George W.; Crandall, Craig A.; Pope, Joseph; Suggs, Sidney. *Biochimica et Biophysica Acta*. 1260(1). 1995. 27-34.
92. Chen, Bao-Lu; Arakawa, Tsutomu; Hsu, Eric; Narhi, Linda O.; Tressel, Timothy J.; Chien, Shu Lin.. *Journal of Pharmaceutical Sciences*. 83(12). 1994. 1657-1661.
93. Arakawa, Tsutomu; Haniu, Mitsuru; Narhi, Linda O.; Miller, James A.; Taslvenheim, Jane; Philo, John S.; Chute, Hilary T.; Matheson, Christine; Carnahan, Josette; Louis, Jean-

- Claude; Yan, Qiao; Welcher, Andrew A.; Rosenfeld, Robert. *Journal of Biological Chemistry*. 269(45). 1994. 27833-27839.
94. Prestrelski, Steven J.; Arakawa, Tsutomu; Duker, Karen; Kenney, William C.; Narhi, Linda O.. *International Journal of Peptide & Protein Research*. 44(4). 1994. 357-363.
 95. Fahnestock, Margaret L.; Johnson, Jennifer L.; Feldman, R. M. Renny; Tsomides, Theodore J.; Mayer, John; Narhi, Linda O.; Bjorkman, Pamela J.. *Biochemistry*. 33(26). 1994. 8149-8158.
 96. Rosenfeld, Robert; Philo, John S.; Haniu, Mitsuru; Stoney, Kendall; Rohde, Michael F.; Wu, Gay-May; Narhi, Linda O.; Wong, Caroline; Boone, Tom. *Protein Science*. 2(10). 1993. 1664-1674.
 97. Haniu, Mitsuru; Narhi, Linda O.; Arakawa, Tsutomu; Elliott, Steve; Rohde, Michael F. *Protein Science*. 2(9). 1993. 1441-1451.
 98. Langley, Keith E.; Mendiaz, Elizabeth A.; Liu, Naili; Narhi, Linda O.; Zeni, Lisa; Parseghian, Carmen M.; Clogston, Christi L.; Leslie, Ian; Pope, Joseph A. *Archives of Biochemistry & Biophysics*. 311(1). 1994. 55-61.
 99. Arakawa, Tsutomu; Prestrelski, Steven J.; Narhi, Linda O.; Boone, Thomas C.; Kenney, William C. *Journal of Protein Chemistry*. 12(5). 1993. 525-531
 100. Narhi, Linda Owers; Rosenfeld, Robert; Wen, Jie; Arakawa, Tsutomu; Prestrelski, Steven J.; Philo, John S. *Biochemistry*. 32(40). 1993. 10819-10825.
 101. Philo, John S.; Rosenfeld, Robert; Arakawa, Tsutomu; Wen, Jie; Narhi, Linda Owers. *Biochemistry*. 32(40). 1993. 10812-10818.
 102. Arakawa, Tsutomu; Horan, Thomas P.; Narhi, Linda O.; Rees, Douglas C.; Schiffer, Susan G.; Holst, Paige L.; Prestrelski, Steven J.; Tsai, Larry B.; Fox, Gary M.. *Protein Engineering*. 6(5). 1993. 541-546.
 103. Rosenfeld, Robert D.; Noone, Nessa M.; Lauren, Scott L.; Rohde, Michael F.; Narhi, Linda O.; Arakawa, Tsutomu. *Journal of Protein Chemistry*. 12(3). 1993. 247-254.
 104. Narhi, Linda O.; Rosenfeldt, Robert; Talvenheimo, Jane; Prestrelski, Steven J.; Arakawa, Tsutomu; Lary, Jeffrey W.; Kolvenbach, Carl G.; Hecht, Randy; Boone, Thomas. *Journal of Biological Chemistry*. 268(18). 1993. 13309-13317.
 105. Miller, James A.; Narhi, Linda Owers; Hua, Qing-Xin; Rosenfeld, Robert; Arakawa, Tsutomu; Rohde, Michael; Prestrelski, Steve; Lauren, Scott; Stoney, Kendall S. *Biochemistry*. 32(19). 1993. 5203-5213.
 106. Narhi, Linda Owers; Hua, Qing-Xin; Arakawa, Tsutomu; Fox, G. Michael; Tsai, Larry; Rosenfeld, Robert; Holst, Paige; Miller, James A.; Weiss, Michael A. *Biochemistry*. 32(19). 1993. 5214-5221.
 107. Kolvenbach, Carl G.; Elliott, Steven; Sachdev, Raj; Arakawa, Tsutomu; Narhi, Linda O. *Journal of Protein Chemistry*. 12(2). 1993. 229-236.
 108. Arakawa, Tsutomu; Hung, Lynne; Pan, Vivien; Horan, Thomas P.; Kolvenbach, Carl G.; Narhi, Linda O. *Analytical Biochemistry*. 208(2). 1993. 255-259.
 109. Narhi, Linda O.; Kenney, William C.; Prestrelski, Steven J.; Arakawa, Tsutomu; Lyons, David; Lary, Jeffrey; Yphantis, David A.. *International Journal of Peptide & Protein Research*. 41(1). 1993. 8-14.
 110. Fahnestock, Margaret L.; Tamir, Ilana; Narhi, Linda; Bjorkman, Pamela J. *Science (Washington D C)*. 258(5088). 1992. 1658-1662.
 111. Lu H.S.; Clogston C.L.; Narhi L.O.; Merewether L.A.; Pearl W.R.; Boone T.C. *Journal of Biological Chemistry*. Vol. 267(13) pp 8770-8777, 1992.

112. Narhi L.O.; Arakawa T.; McGinley M.D.; Rohde M.F.; Westcott K.R. *International Journal of Peptide & Protein Research*. Vol. 39(2)(pp 182-187), 1992.
113. Arakawa, T.; Hung, L.; Narhi, L.O. *Journal of Protein Chemistry*. 11(2):111-7, 1992 Apr.
114. Lichenstein H.S.; Busse L.A.; Smith G.A.; Narhi L.O.; McGinley M.O.; Rohde M.F.; Katzowitz J.L.; Zukowski M.M. *Gene*. Vol. 111(1)(pp 125-130), 1992.
115. Prestrelski S.J.; Arakawa T.; Wu C-S.C.; O'Neal K.D.; Westcott K.R.; Narhi L.O. *Journal of Biological Chemistry*. Vol. 267(1)(pp 319-322), 1992.
116. Arakawa T.; Hung L.; McGinley M.G.; Rohde M.F.; Narhi L.O. *Journal of Protein Chemistry*. 11(2):171-6, 1992
117. Prestrelski S.J.; Arakawa T.; Wu C.S.; O'Neal K.D.; Westcott K.R.; Narhi L.O. *Journal of Biological Chemistry*. 267(1):319-22, 1992 Jan 5.
118. Narhi L.O.; Arakawa T.; Aoki K.H.; Elmore R.; Rohde M.F.; Boone T.; Strickland T.W.. Vol. 266(34)(pp 23022-23026), 1991.
119. Narhi, L.O.; Stabinsky, Y.; Levitt, M.; Miller, L.; Sachdev, R.; Finley, S.; Park, S.; Kolvenbach, C.; Arakawa, T.; Zukowski, M. *Biotechnology & Applied Biochemistry*. 13(1):12-24, 1991 Feb.
120. Arakawa T.; Yphantis D.A.; Lary J.W.; Narhi L.O.; Lu H.S.; Prestrelski S.J.; Clogston C.L.; Zsebo K.M.; Mendiaz E.A.; Wypych J.; Langley K.E. *Journal of Biological Chemistry*. Vol. 266(28)(pp 18942-18948), 1991.
121. Arakawa, T. and Narhi, L. O.. *Biotechnology & Applied Biochemistry*. 13(2):151-72, 1991 Apr.
122. Narhi L.O.; Connor J.; Rohde M.F.; McGinley M.G.; Arakawa T. *Journal of Protein Chemistry*. 10(4):385-9, 1991 Aug.
123. Narhi, L.O., Kenney, W.C., and Arakawa, T. *Journal of Protein Chemistry*, 10(4), 359-367, 1991
124. Elliott S.; Fagin .K.D.; Narhi L.O.; Miller J.A.; Jones M.; Koski R.; Peters M.; Hsieh P.; Sachdev R.; Rosenfeld R.D.; Rohde M.F.; Arakawa T. *Journal of Protein Chemistry*. Vol. 9(1)(pp 95-104), 1990
125. Arakawa T.; Visger J.V.; McGinley M.; Rohde M.F.; Fox G.M.; Narhi L.O. *Protein Engineering*. 3(8):721-4, 1990 Aug.
126. Narhi L.O.; Kita Y.; Arakawa T. Vol. 182(2)(pp 266-270), 1989.
127. Narhi L.O. and Arakawa T. *Biochimica et Biophysica Acta* . Vol. 990(2)(pp 144-149), 1989.
128. Narhi, L. O.; Rhode, M. F.; Hunt, P.; Arakawa, T. *Journal of Protein Chemistry*. 8(5):669-77, 1989 Oct.
129. Narhi L.O. and Fulco A.J. *Journal of Biological Chemistry*. Vol. 261(16)(pp 7160-7169), 1986.
130. Narhi L.O.; Wen L.P.; Fulco A.J.. *Molecular & Cellular Biochemistry*. 79(1):63-71, 1988 Jan.
131. Narhi L.O.; Zukowski M.; Arakawa T.. *Archives of Biochemistry & Biophysics*. 261(1):161-9, 1988 Feb 15.
132. Narhi L.O. and Arakawa T.. *Biochemical & Biophysical Research Communications*. 147(2):740-6, 1987 Sep 15.
133. Narhi, L. O. and Fulco, A J.. *Journal of Biological Chemistry*. 262(14):6683-90, 1987 May 15.

134. Lemmi, C. A.; Wojdani, A.; Adomian, G. E.; Lechago, J.; Dascanio, G.; Narhi, L. O. *Agents & Actions*. 16(5):323-34, 1985 Jul.
135. Schwalb H.; Narhi L.O.; Fulco A.J.. *Biochimica et Biophysica Acta - General Subjects*. Vol. 838(3)(pp 302-311), 1985.
136. Narhi, L. O.; Kim, B. H.; Stevenson, P. M.; Fulco, A. J. *Biochemical & Biophysical Research Communications*. 116(3):851-8, 1983 Nov 15.
137. Fulco, A. J.; Kim, B. H.; Matson, R. S.; Narhi, L. O.; Ruettinger, R. T.. *Molecular & Cellular Biochemistry*. 53-54(1-2):155-61, 1983.
138. Narhi, L. O. and Fulco, A J.. *Journal of Biological Chemistry*. 257(5):2147-50, 1982 Mar 10.

Presentations etc.: More than 20 presentations in past 5 years alone, >100 throughout career

- Includes presentations at conferences, lectures at UCLA, UCSB, USC, Cal Tech, Stanford, NIST, USP, webinars through AAPS and USP, and several lunch and learn seminars at FDA on analytics and biological consequences of particles