CURRICULUM VITAE

PAUL R. MEERS, Ph.D.

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SUMMARY

- Assistant Professor/Director/Principal Scientist with broad experience in academia and the pharmaceutical industry – ranging from formulation chemistry and physics to membrane and protein biochemistry and cell/molecular/preclinical biology.
- Research/teaching interests – Nanotechnology/biotechnology – specific areas – biomolecule drug delivery for gene silencing or transfection, mechanism(s) of vesicular nucleic acid delivery, membrane fusion, protein-lipid interactions, biology and biophysical chemistry of cellular membranes; spectroscopic methods *in vivo* and *in vitro*; biofilm growth and structure.
- Ability to design research projects, run laboratories, obtain grant funding, manage budgets, teach courses, present research, generate publications, produce intellectual property, and provide leadership, creativity, ideas and new approaches to solving research problems.

Examples:

- Established undergraduate research program at Rutgers University
- Obtained funding from Busch Biomedical Research Foundation
- Designed and patented novel anionic lipid-based gene delivery system – work published in Gene Therapy.
- Designed and patented novel liposome targeting system and nanoscale liposomes for site-specific drug delivery – published in scientific journals.
- Led internal Transave inhaled siRNA delivery project – produced unique proprietary non-cationic liposomal delivery systems for delivery of siRNA to the lung – patent filed.
- Established and led collaborative siRNA lung delivery research projects with 2 major RNAi companies, and directed proof-of-concept research that led to a project funded by a large pharmaceutical company.
- Wrote Cystic Fibrosis Foundation Therapeutics Development Grant for inhaled liposomal antibiotic – obtained funding and directed work to meet milestones for payments (at a 50/50 match, $1.7 M each).
- Proposed and established a possible key mechanism of action of lead inhalation product at Transave, Arikace™ - wrote signature peer-reviewed scientific publication introducing Arikace™.
- Led two joint venture (JV) projects in drug delivery; established timelines, milestones and research design –Elan-Ribozyme JV, Elan-Targeted Genetics JV.
- Instituted and supervised bioanalytical work at Transave; instituted validated assays for patient samples.

PROFESSIONAL EXPERIENCE

Rutgers University **Feb. 2011 – present**

School of Environmental and Biological Sciences (Sept. 2011-present)

Director&Instructor, Undergraduate Biotechnology Program (July 2015-present)

Co-Director&Instructor, Master of Business and Science in Biotechnology & Genomics Concentration (July 2012-present)

- *Academic appointment: Dept. of Plant Biology and Pathology*
- *Member: Center for Lipid Research*
- *Instructor, Biotechnology curriculum, MBS curriculum*
- *Webmaster – biotech.rutgers.edu*
- *Advisory board member, Biotechnology High School, Freehold, NJ*

Innovative Biopharmaceutical Delivery **June 2009 – present**

Consultant - e.g. Vertex, Inc., Cardigant Inc., Caliber Therapeutics, Inc.

Monmouth University **Jan 2010 – Aug. 2011**

Adjunct Faculty, Dept. Chemistry, Medical Technology and Physics

- Taught various Chemistry courses, lecture and laboratory

Scicore Academy **Sept. 2010 – Aug. 2011**

Faculty member – secondary science education

- Taught several classes in Biology and Chemistry, lecture and laboratory
- Led student research projects

Transave, Inc. **2003- 2009**

Consultant (April - May 2009)

Senior Principal Scientist, Drug Delivery Research (March 2008 - March 2009)

Director of Drug Delivery Research (May 2006 - March 2008)

Director of Biological/Preclinical Research and Development (Jan. 2004 - May 2006)

Consultant (May -Dec. 2003)

Responsibilities:

- Led a group of several Ph.D. scientists and technicians in formulation, biological testing and aerosol characterization for inhaled delivery of liposomes containing antibiotics, cancer chemotherapeutics or nucleic acid therapeutics, including Transave's lead product Arikace™ - Established a key mechanism of action of Arikace™ - wrote signature peer-reviewed scientific publication introducing Arikace™ and investigating biofilm penetration and drug release.

- Led internal Transave inhaled siRNA delivery project – produced unique proprietary non-cationic liposomal delivery systems for delivery of siRNA to the lung.
- Presented Transave data for potential outside collaborators.
- Established and led collaborative siRNA lung delivery research projects with 2 major RNAi companies. Research also led to a later project with a major pharmaceutical company.
- Participated in evaluation of technology licensing opportunities for liposomal formulations.
- Participated in intellectual property development, filing of patents.
- Supervised preclinical efficacy models, biodistribution and pharmacokinetic studies at Transave – inhalation delivery formulations for cystic fibrosis and lung cancer.
- Participated in oversight and evaluation of outsourced GLP preclinical toxicology
- Participated in review of IND documents and Investigators Brochure.
- Prepared and submitted grant proposals for drug development in the area of liposome-based inhalation therapeutics**.**
- Supervised bioanalytical work for samples from clinical trials.
- Ran company IACUC

Elan Corporation/The Liposome Company, Princeton, NJ
Consultant (March 2003) (Elan)
Director, Membrane Research* (*1998 – 2002) (The Liposome Co./Elan)
Assistant Director, Membrane Research* (*1994 – 1998) (The Liposome Company)

Responsibilities:

- Directed research group of Ph.D. scientists in development of fusogenic liposomes for gene/drug delivery; from formulation through *in vitro* and small scale *in vivo* experiments.
- Designed and patented novel anionic lipid-based gene delivery system – work published in Gene Therapy.
- Designed and patented novel liposome targeting system.
- Designed and patented enzyme-activated liposomes for drug site specific delivery.
- Participated in patent portfolio maintenance.
- Led two joint venture (JV) projects; established timelines, milestones and research design –Elan-Ribozyme JV, Elan-Targeted Genetics JV.
- Made presentations to potential joint venture partners, presented summary of research stage intellectual property to parties interested in acquisition.
- Participated in evaluation of technology licensing opportunities.

Drexel University. Philadelphia, PA
Guest lecturer, Department of Biology

- BIO 615 course – Proteins – content included discussion of protein-lipid interactions, biological roles of peripheral membrane proteins, physical parameters that govern interactions at the surface of phospholipid bilayers

Boston University School of Medicine, Boston, MA
Assistant Professor of Pathology and Biophysics

- Faculty member- supervised and provided grant-funding for research laboratory - protein-lipid interactions, membrane fusion, neutrophil biochemistry; taught primarily graduate level courses

EDUCATION

- Ph.D., Biochemistry, Cornell University, Ithaca, NY - Dr. Gerald Feigenson, advisor
- B.A., Chemistry *summa cum laude*, Illinois Wesleyan University, Bloomington, IL

AWARDS AND GRANTS

- Charles and Johanna Busch Grant for Biomedical Research, Rutgers University, 2013
- Cystic Fibrosis Foundation Grant, approximately $3.4 million total, matching grant (i.e. $1.7 million from CFF) – Transave, Inc.
- National Institutes of Health R29 Grant Award, $350,000 direct, approx. $550,00 total - Boston University School of Medicine
- Arthritis Foundation Investigator Award - Boston University School of Medicine
- American Cancer Society Grant-in-Aid - Boston University School of Medicine
- Arthritis Foundation Fellowship - University of California, San Francisco
- American Cancer Society postdoctoral fellowship - University of California, San Francisco,
- National Institutes of Health National Research Service Award for graduate training at Cornell University
- American Institute of Chemists' Chemistry Award - Illinois Wesleyan University

MEMBERSHIPS

- New Jersey Technology Council
- BioNJ
- The International Society for Aerosols in Medicine
- The International Liposome Society
- Biophysical Society
- American Chemical Society
- Phi Kappa Phi Academic Honor Society,
- Beta Beta Beta Biological Society (at Illinois Wesleyan University)

PEER REVIEW

- Member of Editorial Board of Journal of Liposome Research

- Review manuscripts for scientific journals: e.g. Biochemistry, Biophysical Journal, Biochimica Biophysica Acta, Journal of Membrane Biology, Science, Journal of Lipid Research, Journal of Liposome Research, etc.
- Served as grant reviewer for National Institutes of Health, National Science Foundation, American Heart Association; member of NIH special study section.

PUBLICATIONS LIST

Peer-Reviewed or Edited Publications (reverse chronology):

1. Alsante, K.M., Huynh-Ba, K., Baertschi, S.W., Reed, R.A., Landis, M.S., Kleinman, M.H., Foti, C., Rao, V.M., **Meers, P**., Abend, A., Reynolds, D.W., and Joshi, B.K. (2013) *Recent Trends in Product Development and Regulatory Issues on Impurities in Active Pharmaceutical Ingredient (API) and Drug Products. Part 1: Predicting Degradation Related Impurities and Impurity Considerations for Pharmaceutical Dosage Forms.* AAPS PharmSciTech 11/2013; DOI:10.1208/s12249-013-0047-x

2. **Meers, P. R.** and Ahl, P. L. (2011) *Stress Testing to Determine Liposome Degradation Mechanisms.* In Pharmaceutical Stress Testing: Predicting Drug Degradation, 2nd Edition. Chapter 16, p. 426-446. (S. W. Baertschi, ed.) Informa Healthcare, New York, NY.

3. Weers, J., Metzheiser, B., **Meers, P.,** Taylor, G., Warren, S. and Perkins, W. (2009) *A Gamma Scintigraphy Study to Investigate Lung Deposition and Clearance of Inhaled Amikacin-Loaded Liposomes in Healthy Male Volunteers.* J. Aer. Med. Pulmon. Drug Del. 22(2), 131-138.

4. Li, Z., Zhang, Y., Wurtz, W., Lee, J.K., Malinin, V. S., Durwas-Krishnan, S., **Meers, P.** and Perkins, W.R. (2008) *Characterization of Nebulized Liposomal Amikacin (Arikace^{TM}) as a Function of Droplet Size.* J. Aer. Med. Pulmon. Drug Del. 21(3), 245-254.

5. **Meers, P.**, Neville, M., Malinin, V., Scotto, A. W., Sardaryan, G., Kurumunda, R., Mackinson, C., James, G., Fisher, S. and Perkins, W. R. (2008) *Biofilm penetration, triggered release and in vivo activity of inhaled liposomal amikacin in chronic Pseudomonas aeruginosa lung infections.* J. Antimicrob. Chemother. 61, 859-868.

6. Auguste, D. T., Prud'homme, R. K., Ahl, P. L., **Meers, P.** and Kohn, J. (2006) *Polymer-Protected Liposomes: Association of Hydrophobically-Modified PEG with Liposomes* in Polymeric Drug Delivery, Volume II: Polymeric Matrices and Drug Particle Engineering (Sonke Swenson, ed.) Oxford University Press, New York , NY.

7. Polozova, A., Li, X. Shangguan, T., **Meers, P.**, Schuette, D. R., Nozomi, A., Gruner, S. and Perkins, W. R. (2005) *Formation of homogeneous unilamellar liposomes from an interdigitated matrix.* Biochim. Biophys. Acta 1668, 117-125.

8. Auguste, D. T., Prud'homme, R. K., Ahl, P. L., **Meers, P.** and Kohn, J. (2003) *Association of hydrophobically-modified poly(ethylene glycol) with fusogenic liposomes.* Biochim. Biophys. Acta 1616, 184-195.

9. Düzgünes, N., Bagatolli, L. A., **Meers, P.**, Oh, Y.-K. and Straubinger, R. M. (2003) *Fluorescence methods in liposome research.* in Liposomes: a Practical Approach. (V. Torchilin, ed.), pp. 105-118. Oxford University Press, Inc. New York, NY.

10. **Meers, P.** (2001) *Enzyme-Activated Targeting of Liposomes.* Adv. Drug Delivery Rev. 53, 265-272.

11. Shangguan, T., Cabral-Lilly, D., Purandare, U., Godin, N., Ahl, P., Janoff, A. S. and **Meers, P.** (2000) *A Novel N-Acyl Phosphatidylethanolamine-Containing Delivery System for Spermine-Condensed Plasmid DNA.* Gene Therapy 7, 769-783.

12. **Meers, P.**, Ali, S., Erukulla, R. and Janoff, A. S. (2000) *Inner Monolayer Fusion Assays Reveal Differential Monolayer Mixing Associated with Cation-Dependent Membrane Fusion.* Biochim. Biophys. Acta 1467, 227-243.

13. Pak, C. C., Erukulla, R. K., Ahl, P. L., Janoff, A. S. and **Meers, P.** (1999) *Elastase-Activated Liposomal Delivery to Nucleated Cells.* Biochim. Biophys. Acta 1419, 111-126.

14. Pak, C. C., Ali, S., Janoff, A. S. and **Meers, P.** (1998) *Triggerable Liposomal Fusion by Enzyme-Mediated Cleavage of a Novel Peptide-Lipid Conjugate.* Biochim. Biophys. Acta 1372, 13-27.

15. Shangguan, T., Pak, C. C., Ali, S., Janoff, A. S. and **Meers, P.** (1998) *Cation-Dependent Fusogenicity of an N-Acyl-Phosphatidylethanolamine.* Biochim. Biophys. Acta 1368, 171-183.

16. Ahl, P. L., Bhatia, S. K., **Meers, P.**, Roberts, P., Stevens, R., Dause, R., Perkins, W. R. and Janoff, A. S. (1997) *Enhancement of the in vivo Circulation-Lifetime of DSPC Liposomes: Importance of Liposomal Aggregation versus Complement Opsonization.* Biochim. Biophys. Acta 1329, 370-382.

17. **Meers, P.** (1996) *Annexin Binding to Lipid Assemblies: Some Current Thoughts.* in The Annexins. (B. Seaton. ed.), Chapter 8, pp. 97-119, R.G. Landes, Madison, WI

18. **Meers, P.** (1995) *Liposome-Based Studies of Human Neutrophil Degranulation and Protein-Lipid Interactions in Membrane Fusion.* J. Liposome Res. 5, 761-787.

19. **Meers, P.** and Mealy, T. R. (1994) *Phospholipid Determinants for Annexin V Binding Sites and the Role of Tryptophan 187.* Biochemistry 33, 5829-5837.

20. **Meers, P.** and Mealy, T. R. (1993) *Calcium-Dependent Annexin V Binding to Phospholipids: Stoichiometry, Specificity and the Role of Negative Charge.* Biochemistry 32, 11711-11721.

21. **Meers, P.** and Mealy, T. R. (1993) *Relationship Between Annexin V Tryptophan Exposure, Calcium and Phospholipid Binding.* Biochemistry 32, 5411-5418.

22. **Meers, P.**, Mealy, T. R. and Tauber, A. I. (1993) *Annexin I Interactions with Human Neutrophil Specific Granules: Fusogenicity and Coaggregation with Plasma Membrane Vesicles.* Biochim. Biophys. Acta 1147, 177-184.

23. **Meers, P.**, Mealy, T., Pavlotsky, N. and Tauber, A. I. (1992) *Annexin I-Mediated Vesicular Aggregation: Mechanism and Role in Human Neutrophils.* Biochemistry 31, 6372-6382.

24. Oshry, L., **Meers, P.**, Mealy, T., Pavlotsky, N. and Tauber, A. I. (1991) *Annexin-Mediated Membrane Fusion in Human Neutrophils.*Trans. Assoc. Am. Phys. 104, 213-220.

25. **Meers, P.**, Hong, K. and Papahadjopoulos, D. (1991) *Annexin-Phospholipid Interactions in Membrane Fusion*. in Cell and Model Membrane Interactions. (S. Ohki. ed.), pp. 115-134 Plenum Press, New York, NY.

26. **Meers, P.**, Hong, K. and Papahadjopoulos, D. (1991) *Role of Specific Lipids and Annexins in Calcium-Dependent Membrane Fusion.* Ann. N.Y. Acad. Sci. 635, 259-272.

27. Oshry, L., **Meers, P.**, Mealy, T. and Tauber, A. I. (1991) *Annexin-Mediated Membrane Fusion of Human Neutrophil Plasma Membranes and Phospholipid Vesicles.* Biochim. Biophys. Acta 1066, 239-244.

28. **Meers, P.**, Daleke, D., Hong, K. and Papahadjopoulos, D. (1991) *Interactions of Annexins with Membrane Phospholipids.* Biochemistry 30, 2903-2908.

29. **Meers, P.** (1990) *Location of Tryptophans in Membrane Bound Annexins*. Biochemistry 29, 3325-3330.

30. Hong, K., **Meers, P.**, Düzgünes, N. and Papahadjopoulos, D. (1991) *Fusion of Liposomes Induced and Modulated by Proteins and Polypeptides.* in Cellular Membrane Fusion (J. Wilschut and D. Hoekstra, eds.) pp. 195-208, Marcel Dekker, Inc., New York, NY.

31. Papahadjopoulos, D., **Meers, P.**, Hong, K., Ernst, J. D., Goldstein, I. M. and Düzgünes, N. (1988) *Calcium-Induced Membrane Fusion : From Liposomes to Cellular Membranes* in Molecular Mechanisms of Membrane Fusion. (S. Ohki, D. Doyle, T. D. Flanagan, S. W. Hui and E. Mayhew, eds.) pp. 1-16, Plenum Press, New York, NY.

32. **Meers, P.**, Hong, K., and Papahadjopoulos, D. (1988) *Synergistic Effects of Fatty Acids with Synexin and Other Promoters of Vesicle Aggregation* Biochemistry 27, 6784-6794.

33. **Meers, P.**, Bentz, J., Alford, D., Nir, S., Papahadjopoulos, D. and Hong, K. (1988) *Synexin Enhances the Aggregation Rate But Not the Fusion Rate of Liposomes.* Biochemistry 27, 4430-4439.

34. **Meers, P.** and Feigenson, G. W. (1988) *Location and Ion-Binding of Membrane-Associated Valinomycin, a Proton Magnetic Resonance Study.* Biochim. Biophys. Acta 938, 469-482.

35. **Meers, P.**, Hong, K. and Papahadjopoulos, D. (1987) *Studies on the Binding of Synexin to Phospholipid Vesicles.* in Calcium Binding Proteins in Health and Disease (A.W. Norman, T.C. Vanaman and A.R. Means, eds.) pp. 388-390, Academic Press, Orlando, FL.

36. **Meers, P.**, Ernst, J. D., Hong, K., Düzgünes, N., Fedor, J., Goldstein, I. M. and Papahadjopoulos, D. (1987) *Synexin-Like Proteins in the Cytosol of Polymorphonuclear Leukocytes: Identification and Characterization of Granule-Aggregating and Membrane-Fusing Activities.* J. Biol. Chem. 262, 7850-7858.

37. Ernst, J. D., **Meers, P.**, Hong, K., Düzgünes, N., Papahadjopoulos, D. and Goldstein, I. M. (1986) *Human Polymorphonuclear Leukocytes Contain Synexin, a Calcium-BindingProtein that Promotes Membrane Fusion.* Trans. Assoc. Amer. Phys. 99, 58-66.

38. Hong, K., Düzgünes, N., **Meers, P. R.** and Papahadjopoulos, D. (1986) *Protein Modulation of Liposome Fusion.* in Cell Fusion (A. Sowers, ed.), pp. 269-284, Plenum Publishing Corporation, New York, NY.

39. **Meers, P.**, Hong, K., Bentz, J. and Papahadjopoulos, D. (1986) *Spermine as a Modualtor of Membrane Fusion: Interactions With Acidic Phospholipids.* Biochemistry 25, 3109-3118.

40. **Meers, P**. **R.** and Feigenson, G. W. (1985) *Use of ^{31}PNMR Spectroscopy to Follow the Time Course of Phosphatidylcholine Chemical Synthesis.* J. Lipid Res. 26, 882-888.

41. Tank, D. W., Wu, E. S. **Meers, P. R.** and Webb, W. W. (1982) *Lateral Diffusion of Gramicidin C in Phospholipid Multibilayers Containing Cholesterol.* Biophys. J. 40, 129-135.

42. Feigenson, G. W. and **Meers, P. R.** (1980) *Valinomycin Conformation in a Phospholipid Bilayer: a ^{1}HNMR Study.* Nature 283, 313-314.

43. Feigenson, G. W., **Meers, P. R.** and Kingsley, P. B. (1977) *NMR Observation of Gramicidin A' in Lecithin Vesicles.* Biochim. Biophys. Acta 471, 487-491

Invited Speaker:

1. December 4, 2015 – *Entropic Careers,* Stony Brook University, Department of Biochemistry

2. May 16th, 2014 - *Vesicular Delivery Vehicles for Lung Diseases*, Division of Pulmonary and Critical Care Conference at Robert Wood Johnson Hospital, New Brunswick, NJ

3. October 13, 2012 - *Liposomal Degradation*, AAPS Workshop on Predicting and Monitoring Impurities in API and Drug Products: Product Development and Regulatory Issues, at the American Association of Pharmaceutical Scientists National Meeting, Chicago, IL

4. May 23, 2006 - *Application of SLIT™ Technology to The Delivery of Inhaled Antibiotics In CF Patients* in Mini-Symposium: Novel Approaches to the Assessment and Treatment of CF Lung Disease. Annual Meeting of the American Thoracic Society, San Diego, CA

5. October 20, 2005 – *SLIT™ Amikacin Drug Release Mediated by Pseudomonas aeruginosa Infection.* 19th Annual North American Cystic Fibrosis Conference 2005. Baltimore, MD.

Selection of Published Abstracts of Presentations at Scientific Meetings:

1. Ficurilli, M.,Liu, C., Riviello, C., Pozo, M.J. and **Meers, P.** (2015) *Delivery of Liposomal Contents to Outer Membrane Vesicles from a Gram Negative Bacterium.* Biophys. J. 108(2) suppl 2, 408a.

2. Bartos, W., Chen, R., Kobayashi, D. and **Meers, P.** (2013) *Studies on the Membrane-Active Behavior of Outer Membrane Vesicles from a Gram Negative Bacterium.* Biophys. J. 104(2) suppl1, 90a-91a.

3. **Meers, P**., Li, Z., Neville, M., Sardaryan, G. and Perkins, W. (2007) *Inhaled delivery and activity of Arikace™, a liposomal amikacin formulation for Pseudomonas infection in cystic fibrosis patients.* J. Aerosol Med. Pulmon. Drug Del. 2007 abstracts annual ISAM meeting, Tours, France.

4. **Meers, P**., Malinin, V., Lee, J., Neville, M., Sardaryan, G., James, G., Fisher, S. and Perkins, W.R. (2007) *Pseudomonas biofilm penetration and activity of liposomal amikacin (Arikace™)*. Ped. Pulmon. Supl. 30, 322

5. **Meers, P**., Neville, M., Kurumunda, R., Sardaryan, G., Pilkiewicz, K., Nicholson, S., Weers, J. and Pilkiewicz, F. (2005) *SLIT™Amikacin drug release mediated by P. aeruginosa infection.* Ped. Pulmon. Supl. 28, 265.

6. **Meers, P**., Malinin, V., Neville, M., Mackinson, C., Kurumunda, R., Boni, L. and Pilkiewicz, F. (2004). *Studies on the Mechanisms of Sustained Drug Release from SLIT™Amikacin.* Ped. Pulmon. Supl. 27, 251.

7. Boni, L., Miller, B., Portnoff, J. Scotto, A., Mackinson, C., Kurumunda, R., **Meers, P.** and Pilkiewicz, F. (2004) *Liposomal Amikacin (SLIT^{TM}) Activity Against Pseudomonas Aeruginosa*. Ped. Pulmon. Supl. 27, 251,

8. Ahl, P., Harvie, P., Choice, E., Anklesaria, P., Paul, R. W., Cudmore, S., O'Mahony, D. and **Meers, P.** (2002) *DSPE-PEG Reduced Serum Complement Opsonization of Lipid-Protamine-DNA (LPD) Lipoplexes.* Mol. Therapy 5, S74.

9. Shangguan, T., Li, X., Polozova, A., Perkins, W. and **Meers, P.** (2002) *Efficient Plasmid DNA Encapsulation into Medium Sized N-Acyl Phosphatidylethanolamine-Containing Liposomes for Gene Delivery.* Mol. Therapy 5, S74.

10. Ahl, P. L., Janoff, A. and **Meers, P.** (2001) *In vitro Antibody-Directed Targeting of Fusogenic DNA-Encapsulating Liposomes.* Mol. Therapy 3, S195.

11. Shangguan, T., Cabral-Lilly, D., Erukulla, R., Janoff, A. S. and **Meers, P.** (2000) *Receptor Targeted Modular Gene Delivery Based on N-Acyl Phosphatidylethanolamine-Containing Liposomes.* Mol. Therapy 1(5), S334-S335.

12. Cabral-Lilly, D., Ahl, P,, Erukulla, R., Janoff, A. S. and **Meers, P.** (2000) *Novel Liposomes for Reversible, pH-Dependent Binding of Targeting Complexes for Gene Delivery.* Mol. Therapy 1(5), S335.

Patents:

1. **Meers, P.**, Shangguan, T., Cabral-Lilly, D., Ahl, P. and Janoff, A. *Encapsulation of Bioactive Complexes in Liposomes.* U.S. Patent 7,491,409 issue date February 17, 2009.

2. **Meers, P.**, Shangguan, T., Cabral-Lilly, D., Ahl, P., Erukulla, R. and Janoff, A. *Modular Targeted Liposomal Delivery System.* U.S. Patent 7,060,291 issue date June 13, 2006.

3. **Meers, P. R**., Pak, C., Ali, S., Janoff, A., Franklin, J. C., Erukulla, R. and Cabral-Lilly, D. *Peptide-Lipid Conjugates, Liposomes and Liposomal Drug Delivery*. U.S. Patent 6,339,069, issue date January 15, 2002.

4. **Meers, P. R.**, Shangguan, T. S., Ali, S., Janoff, A. and Pak, C. *N-Acylphosphatidylethanolamine-mediated liposomal drug delivery.* U.S. Patent 6,294,191, issue date: Sept. 25, 2001

5. **Meers, P. R.**, Pak, C., Ali, S., Janoff, A., Franklin, J. C., Erukulla, R. and Cabral-Lilly, D. *Liposomal Peptide-Lipid Conjugates and Delivery Using Same.* U.S. Patent 6,143, 716; issue date November 7, 2000.

6. **Meers, P. R.**, Shangguan, T. S., Ali, S., Janoff, A. and Pak, C. *N-Acylphosphatidylethanolamine-mediated liposomal drug delivery.* U.S. Patent 6,120,797, issue date: Sept. 19, 2000.

7. **Meers, P. R.**, Pak, C., Ali, S., Janoff, A., Franklin, J. C., Erukulla, R. and Cabral-Lilly, D. *Peptide-Lipid Conjugates.* U.S. Patent 6,087,325, issue date: July 11, 2000.

Patents Pending:

1. **Meers, Paul, R.** and Perkins, W. R. *Liposomal siRNA Formulations and Methods of Use Thereof.* U.S. Patent Application Provisional 61/118271 (Nov. 26, 2008).

2. **Meers, P. R.** and Perkins, W. R. *Liposomal Cystic Fibrosis Therapy* U.S. Patent Application Provisional 61/118262 (Nov. 26, 2008).

3. Perkins, W. R., Malinin, V. and **Meers, P. R.** *Formulations of DNase and Methods of Use Thereof.* PCT US07.079911 and WO08/039989 (Sept. 28, 2007).

4. Li, X., Shangguan, T., Polozova, A., **Meers, P.** and Perkins, W. *Efficient Liposomal Encapsulation* PCT 10/500932.(Jan. 8, 2003).

5. Shangguan, T., Li, X., Shangguan, T., **Meers, P**. and Perkins, W.R. *Efficient Liposomal Encapsulation into Medium Sized Liposomes*. U.S. Patent Application 20060058249 (filed: Jan 8, 2003).