Stanford

Jennifer R. Cochran

Senior Associate Vice Provost for Research, Addie and Al Macovski Professor and Professor of Bioengineering

CONTACT INFORMATION

- **Administrative Contact**

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Bio

BIO

Jennifer Cochran is the Senior Associate Vice Provost for Research and Addie and Al Macovski Professor of Bioengineering and, by courtesy, of Chemical Engineering. She is a member of the Cancer Biology, Biophysics, and Immunology graduate programs. Dr. Cochran also serves as a member of the leadership team and former Director of the Stanford/NIH Biotechnology pre-doctoral training program. Her research group uses interdisciplinary approaches in chemistry, engineering, and biophysics to study complex biological systems and to develop new tools for basic science and biomedical applications. Dr. Cochran's translational interests span protein-based drug discovery and development for applications in oncology and regenerative medicine, and the development of new technologies for high-throughput protein analysis and engineering. Dr. Cochran obtained her Ph.D. in Biological Chemistry from the Massachusetts Institute of Technology, where she also completed a postdoctoral fellowship in Biological Engineering.

ACADEMIC APPOINTMENTS

- Professor, Bioengineering
- Member, Bio-X
- Member, Cardiovascular Institute
- Member, Maternal & Child Health Research Institute (MCHRI)
- Faculty Fellow, Sarafan ChEM-H
- Member, Stanford Cancer Institute
- Member, Wu Tsai Neurosciences Institute

ADMINISTRATIVE APPOINTMENTS

- Faculty Director, Innovative Medicines Accelerator Protein Therapeutics Initiative, (2021- present)
- Chair, Stanford Bioengineering, (2017-2022)
- Chair/Principle Investigator, Bioengineering Coulter Grant, (2017-2022)
- Co-Director, Stanford-NIST Pre-Doctoral Training Grant, (2015-2020)
- Director, Stanford-NIH Biotechnology Predoctoral Training Grant, (2014- present)

- Director of Graduate Studies, Stanford Bioengineering, (2014-2018)

HONORS AND AWARDS

- College of Fellows, American Institute for Medical and Biological Engineering (AIMBE) (2018)
- Hellman Faculty Scholar Award, Hellman Foundation (2008)
- Martin D. Abeloff Scholar Award, V Foundation (2008)
- Kimmel Scholars Award, Sidney Kimmel Foundation (2007)
- Mallinckrodt Faculty Scholar Award, Edward Mallinckrodt Jr. Foundation (2007)
- McCormick Award, McCormick Foundation (2007)
- Translational Partnership Award, Wallace H. Coulter Foundation (2006, 2007)
- Howard Temin Award, NIH / National Cancer Institute (2004)

PROFESSIONAL EDUCATION

- Postdoctoral Fellow, MIT , Biological Engineering
- Ph. D., MIT , Biological Chemistry (2001)
- B.S., University of Delaware , Biochemistry (1995)

LINKS

- Cochran Lab website: https://cochranlab.stanford.edu/

Research & Scholarship

CURRENT RESEARCH AND SCHOLARLY INTERESTS

The Cochran laboratory uses interdisciplinary approaches in chemistry, engineering, and biophysics to study complex biological systems. Our main goals are to develop new technologies for basic science and biomedical applications. Clinical applications of our research involves wound healing, cardiac tissue regeneration, ocular disease, and cancer imaging and therapy. Our research is driven by the philosophy that in order to control physiological processes it is necessary to understand the molecular mechanisms that drive these processes. We are interested in elucidating molecular details of receptor-mediated cell signaling events; at the same time developing protein and peptide-based tools that will allow us to manipulate cellular processes on a molecular level. For biomedical applications, we are combining rational design and combinatorial methods to create designer protein therapeutics and diagnostic agents.

Examples of our work are highlighted here:

- http://news.stanford.edu/news/2014/september/metastasis-protein-therapy-092114.html

- https://news.stanford.edu/2015/12/07/proteins-scale-extraction-120715/

- https://news.stanford.edu/2016/06/16/stanford-scientists-create-guided-chemotherapy-missiles-target-cancer-cells-spare-healthy-ones/

Teaching

COURSES

2022-23

- BioEntrepreneurship Bootcamp: BIOE 396 (Spr)
- Bioengineering Departmental Research Colloquium: BIOE 393 (Aut)

2021-22

- Bioengineering Departmental Research Colloquium: BIOE 393 (Aut)

STANFORD ADVISEES

Doctoral Dissertation Reader (AC)

Beatriz Atsavapranee, Edward Gao, Aris Kare, Netra Rajesh

Postdoctoral Faculty Sponsor

Robert Lee

Doctoral Dissertation Advisor (AC)

Nayla Abney, Phillip Liu, Jocelyn Padilla, Camille Williams

Doctoral Dissertation Co-Advisor (AC)

Phil Kim

GRADUATE AND FELLOWSHIP PROGRAM AFFILIATIONS

- Bioengineering (Phd Program)
- Biophysics (Phd Program)
- Cancer Biology (Phd Program)
- Immunology (Phd Program)

Publications

PUBLICATIONS

- **An engineered interleukin-1 decoy cytokine inhibits receptor signaling and proliferation in lung adenocarcinoma** *BIOENGINEERING & TRANSLATIONAL MEDICINE*
  McIntosh, B. J., Hartmann, G. G., Yamada-Hunter, S. A., Liu, P., Williams, C. F., Sage, J., Cochran, J. R.
  2023

- **Targeted TLR9 Agonist Elicits Effective Antitumor Immunity against Spontaneously Arising Breast Tumors.** *Journal of immunology (Baltimore, Md. : 1950)*
  Miller, C. L., Sagiv-Barfi, I., Neuhöfer, P., Czerwinski, D. K., Bertozzi, C. R., Cochran, J. R., Levy, R.
  2023

- **Mutational screens highlight glycosylation as a modulator of colony-stimulating factor 3 receptor (CSF3R) activity.** *The Journal of biological chemistry*
  Hollander, M. J., Malaker, S. A., Riley, N. M., Perez, I., Abney, N. M., Gray, M. A., Maxson, J. E., Cochran, J. R., Bertozzi, C. R.
  2023: 104755

- **Enhanced safety and efficacy of protease-regulated CAR-T cell receptors.** *Cell*
  Labanieh, L., Majzner, R. G., Klysz, D., Sotillo, E., Fisher, C. J., Vilches-Moure, J. G., Pacheco, K. Z., Malipatlolla, M., Xu, P., Hui, J. H., Murty, T., Theruvath, J., Mehta, et al
  2022

- **An engineered ligand trap inhibits leukemia inhibitory factor as pancreatic cancer treatment strategy.** *Communications biology*
  Hunter, S. A., McIntosh, B. J., Shi, Y., Sperberg, R. A., Funatogawa, C., Labanieh, L., Soon, E., Wastyk, H. C., Mehta, N., Carter, C., Hunter, T., Cochran, J. R.
  2021; 4 (1): 452

- **Systemic delivery of a targeted synthetic immunostimulant transforms the immune landscape for effective tumor regression.** *Cell chemical biology*
  Miller, C. L., Sagiv-Barfi, I., Neuhöfer, P., Czerwinski, D. K., Artandi, S. E., Bertozzi, C. R., Levy, R., Cochran, J. R.
  2021

- **Engineering a potent receptor superagonist or antagonist from a novel IL-6 family cytokine ligand.** *Proceedings of the National Academy of Sciences of the United States of America*
  Kim, J. W., Marquez, C. P., Sperberg, R. A., Wu, J., Bae, W. G., Huang, P., Sweet-Cordero, E. A., Cochran, J. R.
  2020

- **Antitumor activity of an engineered decoy receptor targeting CLCF1-CNTFR signaling in lung adenocarcinoma.** *Nature medicine*
  Kim, J. W., Marquez, C. P., Kostyrko, K. n., Koehne, A. L., Marini, K. n., Simpson, D. R., Lee, A. G., Leung, S. G., Sayles, L. C., Shrager, J. n., Ferrer, I. n., Paz-Ares, L. n., Gephart, et al
  2019

- **Structure and Functional Binding Epitope of V-domain Ig Suppressor of T Cell Activation.** *Cell reports*
  Mehta, N. n., Maddineni, S. n., Mathews, I. I., Andres Parra Sperberg, R. n., Huang, P. S., Cochran, J. R.
  2019; 28 (10): 2509–16.e5

- **Integrin-targeted cancer immunotherapy elicits protective adaptive immune responses.** *journal of experimental medicine*
  Kwan, B. H., Zhu, E. F., Tzeng, A., Sugito, H. R., Eltahir, A. A., Ma, B., Delaney, M. K., Murphy, P. A., Kauke, M. J., Angelini, A., Momin, N., Mehta, N. K., Maragh, et al
  2017; 214 (6): 1679-1690

- **High-throughput analysis and protein engineering using microcapillary arrays.** *Nature chemical biology*
  Chen, B., Lim, S., Kannan, A., Alford, S. C., Sunden, F., Herschlag, D., Dimov, I. K., Baer, T. M., Cochran, J. R.
  2016; 12 (2): 76-81

- **An engineered Axl 'decoy receptor' effectively silences the Gas6-Axl signaling axis** *NATURE CHEMICAL BIOLOGY*
  Kariolis, M. S., Miao, Y. R., Ii, D. S., Kapur, S., Mathews, I. I., Giaccia, A. J., Cochran, J. R.
  2014; 10 (11): 977-983

- **Engineered knottin peptide enables noninvasive optical imaging of intracranial medulloblastoma.** *Proceedings of the National Academy of Sciences of the United States of America*
  Moore, S. J., Hayden Gephart, M. G., Bergen, J. M., Su, Y. S., Rayburn, H., Scott, M. P., Cochran, J. R.
  2013; 110 (36): 14598-14603

- **De novo design of highly selective miniprotein inhibitors of integrins #v#6 and #v#8.** *Nature communications*
  Roy, A., Shi, L., Chang, A., Dong, X., Fernandez, A., Kraft, J. C., Li, J., Le, V. Q., Winegar, R. V., Cherf, G. M., Slocum, D., Poulson, P. D., Casper, et al
  2023; 14 (1): 5660

- **Broad-spectrum CRISPR-mediated inhibition of SARS-CoV-2 variants and endemic coronaviruses in vitro.** *Nature communications*
  Zeng, L., Liu, Y., Nguyenla, X. H., Abbott, T. R., Han, M., Zhu, Y., Chemparathy, A., Lin, X., Chen, X., Wang, H., Rane, D. A., Spatz, J. M., Jain, et al
  2022; 13 (1): 2766

- **Delivery of CAR-T cells in a transient injectable stimulatory hydrogel niche improves treatment of solid tumors.** *Science advances*
  Grosskopf, A. K., Labanieh, L., Klysz, D. D., Roth, G. A., Xu, P., Adebowale, O., Gale, E. C., Jons, C. K., Klich, J. H., Yan, J., Maikawa, C. L., Correa, S., Ou, et al
  2022; 8 (14): eabn8264

- **Anti-GD2 synergizes with CD47 blockade to mediate tumor eradication.** *Nature medicine*
  Theruvath, J., Menard, M., Smith, B. A., Linde, M. H., Coles, G. L., Dalton, G. N., Wu, W., Kiru, L., Delaidelli, A., Sotillo, E., Silberstein, J. L., Geraghty, A. C., Banuelos, et al
  1800

- **Heterogeneous delivery across the blood-brain barrier limits the efficacy of an EGFR-targeting antibody drug conjugate in glioblastoma.** *Neuro-oncology*
  Marin, B., Porath, K. A., Jain, S., Kim, M., Conage-Pough, J. E., Oh, J., Miller, C. L., Talele, S., Kitange, G. J., Tian, S., Burgenske, D. M., Mladek, A. C., Gupta, et al
  2021

- **VISTA immune-checkpoint blunts radiotherapy induced anti-tumor immune response.**
  Nambiar, D. K., Mehta, N., Maddineni, S., Cao, H., Viswanathan, V., Cheunkarndee, T., Cochran, J. R., Quynh Thu Le
  AMER ASSOC CANCER RESEARCH.2021

- **LYTACs that engage the asialoglycoprotein receptor for targeted protein degradation.** *Nature chemical biology*
  Ahn, G., Banik, S. M., Miller, C. L., Riley, N. M., Cochran, J. R., Bertozzi, C. R.
  2021

- **Neutralizing antibodies targeting the SARS-CoV-2 receptor binding domain isolated from a naive human antibody library.** *Protein science : a publication of the Protein Society*
  Bell, B. N., Powell, A. E., Rodriguez, C., Cochran, J. R., Kim, P. S.

2021

- **Use of Outpatient-Derived COVID-19 Convalescent Plasma in COVID-19 Patients Before Seroconversion.** *Frontiers in immunology*
  Wirz, O. F., Roltgen, K., Stevens, B. A., Pandey, S., Sahoo, M. K., Tolentino, L., Verghese, M., Nguyen, K., Hunter, M., Snow, T. T., Singh, A. R., Blish, C. A., Cochran, et al
  2021; 12: 739037

- **Identification of N-Terminally Diversified GLP-1R Agonists Using Saturation Mutagenesis and Chemical Design.** *ACS chemical biology*
  Longwell, C. K., Hanna, S., Hartrampf, N., Sperberg, R. A., Huang, P., Pentelute, B. L., Cochran, J. R.
  2020

- **PET reporter gene imaging and ganciclovir-mediated ablation of chimeric antigen receptor T-cells in solid tumors.** *Cancer research*
  Murty, S., Labanieh, L., Murty, T., Gowrishankar, G., Haywood, T., Alam, I. S., Beinat, C., Robinson, E., Aalipour, A., Klysz, D. D., Cochran, J. R., Majzner, R. G., Mackall, et al
  2020

- **An engineered antibody binds a distinct epitope and is a potent inhibitor of murine and human VISTA.** *Scientific reports*
  Mehta, N., Maddineni, S., Kelly, R. L., Lee, R. B., Hunter, S. A., Silberstein, J. L., Parra Sperberg, R. A., Miller, C. L., Rabe, A., Labanieh, L., Cochran, J. R.
  2020; 10 (1): 15171

- **Novel NanoLuc substrates enable bright two-population bioluminescence imaging in animals.** *Nature methods*
  Su, Y., Walker, J. R., Park, Y., Smith, T. P., Liu, L. X., Hall, M. P., Labanieh, L., Hurst, R., Wang, D. C., Encell, L. P., Kim, N., Zhang, F., Kay, et al
  2020

- **Multi-phase catheter-injectable hydrogel enables dual-stage protein-engineered cytokine release to mitigate adverse left ventricular remodeling following myocardial infarction in a small animal model and a large animal model.** *Cytokine*
  Steele, A. N., Paulsen, M. J., Wang, H. n., Stapleton, L. M., Lucian, H. J., Eskandari, A. n., Hironaka, C. E., Farry, J. M., Baker, S. W., Thakore, A. D., Jaatinen, K. J., Tada, Y. n., Hollander, et al
  2020; 127: 154974

- **CD52 Is Elevated on B cells of SLE Patients and Regulates B Cell Function.** *Frontiers in immunology*
  Bhamidipati, K. n., Silberstein, J. L., Chaichian, Y. n., Baker, M. C., Lanz, T. V., Zia, A. n., Rasheed, Y. S., Cochran, J. R., Robinson, W. H.
  2020; 11: 626820

- **Defining the features and duration of antibody responses to SARS-CoV-2 infection associated with disease severity and outcome.** *Science immunology*
  Röltgen, K. n., Powell, A. E., Wirz, O. F., Stevens, B. A., Hogan, C. A., Najeeb, J. n., Hunter, M. n., Wang, H. n., Sahoo, M. K., Huang, C. n., Yamamoto, F. n., Manohar, M. n., Manalac, et al
  2020; 5 (54)

- **Structural Basis of the Differential Binding of Engineered Knottins to Integrins alphaVbeta3 and alpha5beta1.** *Structure (London, England : 1993)*
  Van Agthoven, J. F., Shams, H., Cochran, F. V., Alonso, J. L., Kintzing, J. R., Garakani, K., Adair, B. D., Xiong, J., Mofrad, M. R., Cochran, J. R., Arnaout, M. A.
  2019

- **An engineered dimeric fragment of hepatocyte growth factor improves corneal epithelial wound healing in vitro**
  Carter, K., Ye, A., Fernandes-Cunha, G., Cochran, J. R., Myung, D.
  ASSOC RESEARCH VISION OPHTHALMOLOGY INC.2019

- **Next-generation protein therapeutics: Challenges and opportunities**
  Cochran, J.
  AMER CHEMICAL SOC.2019

- **Engineering ligand-based receptor agonists or antagonists as next-generation protein therapeutics**
  Cochran, J.
  AMER CHEMICAL SOC.2018

- **Targeting the CLCF1-CNTFR signaling axis using directed evolution for lung cancer therapy**
  Marquez, C., Kim, J., Giaccia, A., Cochran, J., Sweet-Cordero, A.
  AMER ASSOC CANCER RESEARCH.2018

- **Engineering a potent inhibitor of matriptase from the natural hepatocyte growth factor activator inhibitor type-1 (HAI-1) protein** *JOURNAL OF BIOLOGICAL CHEMISTRY*

Mitchell, A. C., Kannan, D., Hunter, S. A., Sperberg, R., Chang, C. H., Cochran, J. R.
2018; 293 (14): 4969–80

- **Photoactive Split Green Fluorescent Protein: Engineering a New Optogenetic and Imaging System**
  Romei, M. G., Longwell, C. K., Cochran, J. R., Boxer, S. G.
  CELL PRESS.2018: 177A–178A

- **Development of a Protease Biosensor Based on a Dimerization-Dependent Red Fluorescent Protein** *ACS CHEMICAL BIOLOGY*
  Mitchell, A. C., Alford, S. C., Hunter, S. A., Kannan, D., Sperberg, R., Chang, C. H., Cochran, J. R.
  2018; 13 (1): 66–72

- **High-throughput screening technologies for enzyme engineering** *CURRENT OPINION IN BIOTECHNOLOGY*
  Longwell, C. K., Labanieh, L., Cochran, J. R.
  2017; 48: 196–202

- **Heterochiral Knottin Protein: Folding and Solution Structure** *BIOCHEMISTRY*
  Mong, S. K., Cochran, F. V., Yu, H., Graziano, Z., Lin, Y., Cochran, J. R., Pentelute, B. L.
  2017; 56 (43): 5720–25

- **A novel protein-engineered hepatocyte growth factor analog released via a shear-thinning injectable hydrogel enhances post-infarction ventricular function.** *Biotechnology and bioengineering*
  Steele, A. N., Cai, L., Truong, V. N., Edwards, B. B., Goldstone, A. B., Eskandari, A., Mitchell, A. C., Marquardt, L. M., Foster, A. A., Cochran, J. R., Heilshorn, S. C., Woo, Y. J.
  2017

- **Dual display of proteins on the yeast cell surface simplifies quantification of binding interactions and enzymatic bioconjugation reactions** *BIOTECHNOLOGY JOURNAL*
  Lim, S., Glasgow, J. E., Interrante, M. F., Storm, E. M., Cochran, J. R.
  2017; 12 (5)

- **Measurements of translation initiation from all 64 codons in E. coli** *NUCLEIC ACIDS RESEARCH*
  Hecht, A., Glasgow, J., Jaschke, P. R., Bawazer, L. A., Munson, M. S., Cochran, J. R., Endy, D., Salit, M.
  2017; 45 (7): 3615-3626

- **Targeting ligand-receptor interactions for development of cancer therapeutics.** *Current opinion in chemical biology*
  Kim, J. W., Cochran, J. R.
  2017; 38: 62-69

- **Engineered ligand-based VEGFR antagonists with increased receptor binding affinity more effectively inhibit angiogenesis.** *Bioengineering & translational medicine*
  Kapur, S., Silverman, A. P., Ye, A. Z., Papo, N., Jindal, D., Blumenkranz, M. S., Cochran, J. R.
  2017; 2 (1): 81-91

- **Engineering High Affinity Protein-Protein Interactions Using a High-Throughput Microcapillary Array Platform.** *ACS chemical biology*
  Lim, S., Chen, B., Kariolis, M. S., Dimov, I. K., Baer, T. M., Cochran, J. R.
  2017; 12 (2): 336-341

- **Where is the Future of Drug Discovery for Cancer?** *CELL*
  Superti-Furga, G., Cochran, J., Crews, C. M., Frye, S., Neubauer, G., Prinjha, R., Shokat, K.
  2017; 168 (4): 564-565

- **Inhibition of the GAS6/AXL pathway augments the efficacy of chemotherapies** *JOURNAL OF CLINICAL INVESTIGATION*
  Kariolis, M. S., Miao, Y. R., Diep, A., Nash, S. E., Olcina, M. M., Jiang, D., Jones, D. S., Kapur, S., Mathews, I. I., Koong, A. C., Rankin, E. B., Cochran, J. R., Giaccia, et al
  2017; 127 (1): 183-198

- **CAR T-cell immunotherapy of MET-expressing malignant mesothelioma** *ONCOIMMUNOLOGY*
  Thayaparan, T., Petrovic, R. M., Achkova, D. Y., Zabinski, T., Davies, D. M., Klampatsa, A., Parente-Pereira, A. C., Whilding, L. M., van der Stegen, S. C., Woodman, N., Sheaff, M., Cochran, J. R., Spicer, et al
  2017; 6 (12)

- **Engineered Proteins for Visualizing and Treating Cancer**
  Cochran, J. R., Natl Acad Engn
  NATL ACADEMIES PRESS.2017: 101–6

- **Emerging Strategies for Developing Next-Generation Protein Therapeutics for Cancer Treatment** *TRENDS IN PHARMACOLOGICAL SCIENCES*
  Kintzing, J. R., Interrante, M. V., Cochrane, J. R.
  2016; 37 (12): 993-1008

- **Eradication of large established tumors in mice by combination immunotherapy that engages innate and adaptive immune responses.** *Nature medicine*
  Moynihan, K. D., Opel, C. F., Szeto, G. L., Tzeng, A., Zhu, E. F., Engreitz, J. M., Williams, R. T., Rakhra, K., Zhang, M. H., Rothschilds, A. M., Kumari, S., Kelly, R. L., Kwan, et al
  2016

- **Engineered knottin peptides as diagnostics, therapeutics, and drug delivery vehicles** *CURRENT OPINION IN CHEMICAL BIOLOGY*
  Kintzing, J. R., Cochran, J. R.
  2016; 34: 143-150

- **Integrin-Targeting Knottin Peptide-Drug Conjugates Are Potent Inhibitors of Tumor Cell Proliferation.** *Angewandte Chemie (International ed. in English)*
  Cox, N., Kintzing, J. R., Smith, M., Grant, G. A., Cochran, J. R.
  2016; 55 (34): 9894-9897

- **In Vivo Site-Specific Protein Tagging with Diverse Amines Using an Engineered Sortase Variant** *JOURNAL OF THE AMERICAN CHEMICAL SOCIETY*
  Glasgow, J. E., Salit, M. L., Cochran, J. R.
  2016; 138 (24): 7496-7499

- **Targeted Drug Delivery with an Integrin-Binding Knottin-Fc-MMAF Conjugate Produced by Cell-Free Protein Synthesis** *MOLECULAR CANCER THERAPEUTICS*
  Currier, N. V., Ackerman, S. E., Kintzing, J. R., Chen, R., Interrante, M. F., Steiner, A., Sato, A. K., Cochran, J. R.
  2016; 15 (6): 1291-1300

- **Degradable acetalated dextran microparticles for tunable release of an engineered hepatocyte growth factor fragment.** *ACS biomaterials science & engineering*
  Suarez, S. L., Muñoz, A., Mitchell, A., Braden, R. L., Luo, C., Cochran, J. R., Almutairi, A., Christman, K. L.
  2016; 2 (2): 197-204

- **Degradable Acetalated Dextran Microparticles for Tunable Release of an Engineered Hepatocyte Growth Factor Fragment** *ACS BIOMATERIALS-SCIENCE & ENGINEERING*
  Suarez, S. L., Munoz, A., Mitchell, A. C., Braden, R. L., Luo, C., Cochran, J. R., Almutairi, A., Christman, K. L.
  2016; 2 (2): 197-204

- **Engineering growth factors for regenerative medicine applications** *ACTA BIOMATERIALIA*
  Mitchell, A. C., Briquez, P. S., Hubbell, J. A., Cochran, J. R.
  2016; 30: 1-12

- **Cell-Binding Assays for Determining the Affinity of Protein-Protein Interactions: Technologies and Considerations** *PEPTIDE, PROTEIN AND ENZYME DESIGN*
  Hunter, S. A., Cochran, J. R.
  2016; 580: 21-44

- **Engineering growth factors for regenerative medicine applications.** *Acta biomaterialia*
  Mitchell, A. C., Briquez, P. S., Hubbell, J. A., Cochran, J. R.
  2016; 30: 1-12

- **Biocompatibility of poly(ethylene glycol) and poly(acrylic acid) interpenetrating network hydrogel by intrastromal implantation in rabbit cornea** *JOURNAL OF BIOMEDICAL MATERIALS RESEARCH PART A*
  Zheng, L. L., Vanchinathan, V., Dalal, R., Noolandi, J., Waters, D. J., Hartmann, L., Cochran, J. R., Frank, C. W., Yu, C. Q., Ta, C. N.
  2015; 103 (10): 3157-3165

- **Biocompatibility of poly(ethylene glycol) and poly(acrylic acid) interpenetrating network hydrogel by intrastromal implantation in rabbit cornea.** *Journal of biomedical materials research. Part A*
  Zheng, L. L., Vanchinathan, V., Dalal, R., Noolandi, J., Waters, D. J., Hartmann, L., Cochran, J. R., Frank, C. W., Yu, C. Q., Ta, C. N.

2015; 103 (10): 3157-3165

- **Delivery of an engineered HGF fragment in an extracellular matrix-derived hydrogel prevents negative LV remodeling post-myocardial infarction.** *Biomaterials*
  Sonnenberg, S. B., Rane, A. A., Liu, C. J., Rao, N., Agmon, G., Suarez, S., Wang, R., Munoz, A., Bajaj, V., Zhang, S., Braden, R., Schup-Magoffin, P. J., Kwan, et al
  2015; 45: 56-63
- **Interpenetrating polymer network hydrogel scaffolds for artificial cornea periphery.** *Journal of materials science. Materials in medicine*
  Parke-Houben, R., Fox, C. H., Zheng, L. L., Waters, D. J., Cochran, J. R., Ta, C. N., Frank, C. W.
  2015; 26 (2): 107-?
- **A Chemically Cross-Linked Knottin Dimer Binds Integrins with Picomolar Affinity and Inhibits Tumor Cell Migration and Proliferation** *JOURNAL OF THE AMERICAN CHEMICAL SOCIETY*
  Kim, J. W., Cochran, F. V., Cochran, J. R.
  2015; 137 (1): 6-9
- **Applications of Yeast Surface Display for Protein Engineering.** *Methods in molecular biology (Clifton, N.J.)*
  Cherf, G. M., Cochran, J. R.
  2015; 1319: 155-175
- **An engineered dimeric fragment of hepatocyte growth factor is a potent c-MET agonist** *FEBS LETTERS*
  Liu, C. J., Jones, D. S., Tsai, P., Venkataramana, A., Cochran, J. R.
  2014; 588 (24): 4831-4837
- **An engineered Axl 'decoy receptor' effectively silences the Gas6-Axl signaling axis.** *Nature chemical biology*
  Kariolis, M. S., Miao, Y. R., Jones, D. S., Kapur, S., Mathews, I. I., Giaccia, A. J., Cochran, J. R.
  2014; 10 (11): 977-983
- **Cystine-knot peptides: emerging tools for cancer imaging and therapy** *EXPERT REVIEW OF PROTEOMICS*
  Ackerman, S. E., Currier, N. V., Bergen, J. M., Cochran, J. R.
  2014; 11 (5): 561-572
- **Cystine-knot peptides: emerging tools for cancer imaging and therapy.** *Expert review of proteomics*
  Ackerman, S. E., Currier, N. V., Bergen, J. M., Cochran, J. R.
  2014; 11 (5): 561-72
- **A Bioengineered Peptide that Localizes to and Illuminates Medulloblastoma: A New Tool with Potential for Fluorescence-Guided Surgical Resection.** *Cureus*
  Ackerman, S. E., Wilson, C. M., Kahn, S. A., Kintzing, J. R., Jindal, D. A., Cheshier, S. H., Grant, G. A., Cochran, J. R.
  2014; 6 (9)
- **A Bioengineered Peptide that Localizes to and Illuminates Medulloblastoma: A New Tool with Potential for Fluorescence-Guided Surgical Resection** *Cureus*
  Ackerman, S. E., Wilson, C. M., Kahn, S. A., Kintzing, J. R., Jindal, D. A., Cheshier, S. H., Grant, G. A., Cochran, J. R.
  2014
- **Beyond antibodies: using biological principles to guide the development of next-generation protein therapeutics.** *Current opinion in biotechnology*
  Kariolis, M. S., Kapur, S., Cochran, J. R.
  2013; 24 (6): 1072-1077
- **Engineered knottin peptide enables noninvasive optical imaging of intracranial medulloblastoma.** *Proceedings of the National Academy of Sciences of the United States of America*
  Moore, S. J., Hayden Gephart, M. G., Bergen, J. M., Su, Y. S., Rayburn, H., Scott, M. P., Cochran, J. R.
  2013; 110 (36): 14598-14603
- **A novel radiofluorinated agouti-related protein for tumor angiogenesis imaging** *AMINO ACIDS*
  Jiang, H., Moore, S. J., Liu, S., Liu, H., Miao, Z., Cochran, F. V., Liu, Y., Tian, M., Cochran, J. R., Zhang, H., Cheng, Z.
  2013; 44 (2): 673-681
- **Engineering agatoxin, a cystine-knot peptide from spider venom, as a molecular probe for in vivo tumor imaging.** *PloS one*

Moore, S. J., Leung, C. L., Norton, H. K., Cochran, J. R.
2013; 8 (4)

- **Engineering agatoxin, a cystine-knot peptide from spider venom, as a molecular probe for in vivo tumor imaging.** *PloS one*
  Moore, S. J., Leung, C. L., Norton, H. K., Cochran, J. R.
  2013; 8 (4): e60498
- **Engineering Multivalent and Multispecific Protein Therapeutics** *Engineering in Translational Medicine*
  Liu, C., J., Cochran, J., R.
  edited by Cai, W.
  Springer..2013: 1
- **Surface Modification of High-Strength Interpenetrating Network Hydrogels for Biomedical Device Applications** *Handbook of Biofunctional Surfaces*
  Myung, D., Kourtis, L., Noolandi, J., Cochran, J., Ta, C., N., Frank, C., W.
  edited by Knoll, W.
  Pan Stanford Publishing..2013: 407–446
- **Diffusion of Protein through the Human Cornea** *OPHTHALMIC RESEARCH*
  Charalel, R. A., Engberg, K., Noolandi, J., Cochran, J. R., Frank, C., Ta, C. N.
  2012; 48 (1): 50-55
- **Knottins: Disulfide-bonded Therapeutic and Diagnostic Peptides.** *Drug Discovery Today: Technologies*
  Moore, S., J., Leung, C., L., Cochran, J., R.
  2012; 9: e3-e11
- **In-111-Labeled Cystine-Knot Peptides Based on the Agouti-Related Protein for Targeting Tumor Angiogenesis** *JOURNAL OF BIOMEDICINE AND BIOTECHNOLOGY*
  Jiang, L., Miao, Z., Kimura, R. H., Silverman, A. P., Ren, G., Liu, H., Lu, H., Cochran, J. R., Cheng, Z.
  2012
- **ENGINEERING KNOTTINS AS NOVEL BINDING AGENTS** *METHODS IN ENZYMOLOGY: PROTEIN ENGINEERING FOR THERAPEUTICS, VOL 203, PT B*
  Moore, S. J., Cochran, J. R.
  2012; 503: 223-251
- **Discovery of Improved EGF Agonists Using a Novel In Vitro Screening Platform** *JOURNAL OF MOLECULAR BIOLOGY*
  Lui, B. H., Cochran, J. R., Swartz, J. R.
  2011; 413 (2): 406-415
- **Antagonistic VEGF variants engineered to simultaneously bind to and inhibit VEGFR2 and alpha(v)beta(3) integrin** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA*
  Papo, N., Silverman, A. P., Lahti, J. L., Cochran, J. R.
  2011; 108 (34): 14067-14072
- **Engineering hepatocyte growth factor fragments with high stability and activity as Met receptor agonists and antagonists** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA*
  Jones, D. S., Tsai, P., Cochran, J. R.
  2011; 108 (32): 13035-13040
- **Toward the development of an artificial cornea: improved stability of interpenetrating polymer networks.** *Journal of biomedical materials research. Part B, Applied biomaterials*
  Hartmann, L., Watanabe, K., Zheng, L. L., Kim, C., Beck, S. E., Huie, P., Noolandi, J., Cochran, J. R., Ta, C. N., Frank, C. W.
  2011; 98 (1): 8-17
- **Toward the development of an artificial cornea: Improved stability of interpenetrating polymer networks** *JOURNAL OF BIOMEDICAL MATERIALS RESEARCH PART B-APPLIED BIOMATERIALS*
  Hartmann, L., Watanabe, K., Zheng, L. L., Kim, C., Beck, S. E., Huie, P., Noolandi, J., Cochran, J. R., Ta, C. N., Frank, C. W.
  2011; 98B (1): 8-17
- **Engineered epidermal growth factor mutants with faster binding on-rates correlate with enhanced receptor activation** *FEBS LETTERS*
  Lahti, J. L., Lui, B. H., Beck, S. E., Lee, S. S., Ly, D. P., Longaker, M. T., Yang, G. P., Cochran, J. R.

2011; 585 (8): 1135-1139

- **Preliminary evaluation of Lu-177-labeled knottin peptides for integrin receptor-targeted radionuclide therapy** *EUROPEAN JOURNAL OF NUCLEAR MEDICINE AND MOLECULAR IMAGING*
  Jiang, L., Miao, Z., Kimura, R. H., Liu, H., Cochran, J. R., Culter, C. S., Bao, A., Li, P., Cheng, Z.
  2011; 38 (4): 613-622
- **Functional Mutation of Multiple Solvent-Exposed Loops in the Ecballium elaterium Trypsin Inhibitor-II Cystine Knot Miniprotein** *PLOS ONE*
  Kimura, R. H., Jones, D. S., Jiang, L., Miao, Z., Cheng, Z., Cochran, J. R.
  2011; 6 (2)
- **PET Imaging of Integrin Positive Tumors Using F-18 Labeled Knottin Peptides** *THERANOSTICS*
  Liu, S., Liu, H., Ren, G., Kimura, R. H., Cochran, J. R., Cheng, Z.
  2011; 1: 403-412
- **Rational and Combinatorial Methods for Creating Designer Protein Interfaces** *Comprehensive Biomaterials*
  Lui, B., H., Cochran, J, R.
  edited by Ducheyne, H., Hutmacher, G.
  Elsevier..2011: 1
- **Cystine-knot peptides engineered with specificities for alpha(IIb)beta(3) or alpha(IIb)beta(3) and alpha(v)beta(3) integrins are potent inhibitors of platelet aggregation.** *J Mol Recognit.*
  Silverman AP, Kariolis, MS, Cochran, JR
  2011; 24 (1): 127-35
- **Targeting of Cancer Cells Using Quantum Dot-Polypeptide Hybrid Assemblies That Function as Molecular Imaging Agents and Carrier Systems** *ADVANCED FUNCTIONAL MATERIALS*
  Atmaja, B., Lui, B. H., Hu, Y., Beck, S. E., Frank, C. W., Cochran, J. R.
  2010; 20 (23): 4091-4097
- **Targeting of Cancer Cells Using Quantum Dot-Polypeptide Hybrid Assemblies that Function as Molecular Imaging Agents and Carrier Systems.** *Advanced functional materials*
  Atmaja, B., Lui, B. H., Hu, Y., Beck, S. E., Frank, C. W., Cochran, J. R.
  2010; 20 (23): 4091-4097
- **PET Imaging of Tumor Neovascularization in a Transgenic Mouse Model with a Novel Cu-64-DOTA-Knottin Peptide** *CANCER RESEARCH*
  Nielsen, C. H., Kimura, R. H., Withofs, N., Tran, P. T., Miao, Z., Cochran, J. R., Cheng, Z., Felsher, D., Kjaer, A., Willmann, J. K., Gambhir, S. S.
  2010; 70 (22): 9022-9030
- **Targeted Contrast-Enhanced Ultrasound Imaging of Tumor Angiogenesis with Contrast Microbubbles Conjugated to Integrin-Binding Knottin Peptides** *JOURNAL OF NUCLEAR MEDICINE*
  Willmann, J. K., Kimura, R. H., Deshpande, N., Lutz, A. M., Cochran, J. R., Gambhir, S. S.
  2010; 51 (3): 433-440
- **A Dual-Labeled Knottin Peptide for PET and Near-Infrared Fluorescence Imaging of Integrin Expression in Living Subjects** *BIOCONJUGATE CHEMISTRY*
  Kimura, R. H., Miao, Z., Cheng, Z., Gambhir, S. S., Cochran, J. R.
  2010; 21 (3): 436-444
- **Evaluation of a Cu-64-Labeled Cystine-Knot Peptide Based on Agouti-Related Protein for PET of Tumors Expressing alpha(v)beta(3) Integrin** *JOURNAL OF NUCLEAR MEDICINE*
  Jiang, L., Kimura, R. H., Miao, Z., Silverman, A. P., Ren, G., Liu, H., Li, P., Gambhir, S. S., Cochran, J. R., Cheng, Z.
  2010; 51 (2): 251-258
- **A Dual-Labeled Knottin Peptide for PET and Near-Infrared Fluorescence Imaging of Integrin Expression in Living Subjects.** *Bioconjugate chemistry*
  Kimura, R. H., Miao, Z., Cheng, Z., Gambhir, S. S., Cochran, J. R.
  2010
- **Engineered Proteins Pull Double Duty** *SCIENCE TRANSLATIONAL MEDICINE*
  Cochran, J. R.
  2010; 2 (17)

- **Phage display and molecular imaging: expanding fields of vision in living subjects** *BIOTECHNOLOGY AND GENETIC ENGINEERING REVIEWS, VOL 27*
  Cochran, F. V., Cochran, J. R.
  2010; 27: 57-93

- **Phage Display and Molecular Imaging: Expanding Fields of Vision in Living Subjects.** *Biotechnology and Genetic Engineering Reviews.*
  Cochran, F., V., Cochran, J., R.
  2010; 27: 57-94

- **An Engineered Knottin Peptide Labeled with F-18 for PET Imaging of Integrin Expression** *BIOCONJUGATE CHEMISTRY*
  Miao, Z., Ren, G., Liu, H., Kimura, R. H., Jiang, L., Cochran, J. R., Gambhir, S. S., Cheng, Z.
  2009; 20 (12): 2342-2347

- **Engineered cystine knot peptides that bind alpha v beta 3, alpha v beta 5, and alpha 5 beta 1 integrins with low-nanomolar affinity** *PROTEINS-STRUCTURE FUNCTION AND BIOINFORMATICS*
  Kimura, R. H., Levin, A. M., Cochran, F. V., Cochran, J. R.
  2009; 77 (2): 359-369

- **Interrogating and Predicting Tolerated Sequence Diversity in Protein Folds: Application to E. elaterium Trypsin Inhibitor-II Cystine-Knot Miniprotein** *PLOS COMPUTATIONAL BIOLOGY*
  Lahti, J. L., Silverman, A. P., Cochran, J. R.
  2009; 5 (9)

- **Bioactive interpenetrating polymer network hydrogels that support corneal epithelial wound healing.** *Journal of biomedical materials research. Part A*
  Myung, D., Farooqui, N., Zheng, L. L., Koh, W., Gupta, S., Bakri, A., Noolandi, J., Cochran, J. R., Frank, C. W., Ta, C. N.
  2009; 90 (1): 70-81

- **Bioactive interpenetrating polymer network hydrogels that support corneal epithelial wound healing** *JOURNAL OF BIOMEDICAL MATERIALS RESEARCH PART A*
  Myung, D., Farooqui, N., Zheng, L. L., Koh, W., Gupta, S., Bakri, A., Noolandi, J., Cochran, J. R., Frank, C. W., Ta, C. N.
  2009; 90A (1): 70-81

- **Antibodies specifically targeting a locally misfolded region of tumor associated EGFR** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA*
  Garrett, T. P., Burgess, A. W., Gan, H. K., Luwor, R. B., Cartwright, G., Walker, F., Orchard, S. G., Clayton, A. H., Nice, E. C., Rothacker, J., Catimel, B., Cavenee, W. K., Old, et al
  2009; 106 (13): 5082-5087

- **Engineered Knottin Peptides: A New Class of Agents for Imaging Integrin Expression in Living Subjects** *CANCER RESEARCH*
  Kimura, R. H., Cheng, Z., Gambhir, S. S., Cochran, J. R.
  2009; 69 (6): 2435-2442

- **Engineered Cystine-Knot Peptides that Bind alpha(v)beta(3) Integrin with Antibody-Like Affinities** *JOURNAL OF MOLECULAR BIOLOGY*
  Silverman, A. P., Levin, A. M., Lahti, J. L., Cochran, J. R.
  2009; 385 (4): 1064-1075

- **Yeast Surface Display** *Therapeutic Antibodies: from Theory to Practice*
  Lahti, J., L., Cochran, J., R.
  edited by An, Z., Strohl, W.
  John Wiley & Sons, Inc..2009: 1

- **Cell Surface Display Systems for Protein Engineering** *Protein Engineering and Design*
  Moore, S., J., Olsen, M., J., Cochran, J., R., Cochran, F., V.
  edited by Park, Sheldon, J., Cochran, Jennifer, R.
  Taylor and Francis, Boca Raton..2009: 1

- **Protein Engineering and Design**
  edited by J., R., Park, Jennifer
  Taylor and Francis, Boca Raton..2009

- **Developing therapeutic proteins by engineering ligand-receptor interactions** *TRENDS IN BIOTECHNOLOGY*

Jones, D. S., Silverman, A. P., Cochran, J. R.
2008; 26 (9): 498-505

- **Development of hydrogel-based keratoprostheses: A materials perspective** *234th National Meeting of the American-Chemical-Society*
  Myung, D., Duhamel, P., Cochran, J. R., Noolandi, J., Ta, C. N., Frank, C. W.
  WILEY-BLACKWELL.2008: 735–41

- **Design and fabrication of an artificial cornea based on a photolithographically patterned hydrogel construct** *BIOMEDICAL MICRODEVICES*
  Myung, D., Koh, W., Bakri, A., Zhang, F., Marshall, A., Ko, J., Noolandi, J., Carrasco, M., Cochran, J. R., Frank, C. W., Ta, C. N.
  2007; 9 (6): 911-922

- **Elucidation of the interleukin-15 binding site on its alpha receptor by NMR** *BIOCHEMISTRY*
  Hanick, N. A., Rickert, M., Varani, L., Bankovich, A. J., Cochran, J. R., Kim, D. M., Surh, C. D., Garcia, K. C.
  2007; 46 (33): 9453-9461

- **BIOT 66-A novel, biomimetic hydrogel construct to repair the cornea: Molecular design and biological response**
  Myung, D., Cochran, J. R., Noolandi, J., Ta, C. N., Frank, C. W.
  AMER CHEMICAL SOC.2007

- **Improved mutants from directed evolution are biased to orthologous substitutions** *PROTEIN ENGINEERING DESIGN & SELECTION*
  Cochran, J. R., Kim, Y., Lippow, S. M., Rao, B., Wittrup, K. D.
  2006; 19 (6): 245-253

- **Directed evolution of the epidermal growth factor receptor extracellular domain for expression in yeast** *PROTEINS-STRUCTURE FUNCTION AND BIOINFORMATICS*
  Kim, Y. S., Bhandari, R., Cochran, J. R., Kuriyan, J., Wittrup, K. D.
  2006; 62 (4): 1026-1035

- **Fine epitope mapping anti-epidermal growth factor receptor antibodies through random mutagenesia and yeast surface display** *JOURNAL OF MOLECULAR BIOLOGY*
  Chao, G., Cochran, J. R., Wittrup, K. D.
  2004; 342 (2): 539-550

- **Identification of the epitope for the epidermal growth factor receptor-specific monoclonal antibody 806 reveals that it preferentially recognizes an untethered form of the receptor** *JOURNAL OF BIOLOGICAL CHEMISTRY*
  Johns, T. G., Adamas, T. E., Cochran, J. R., Hall, N. E., Hoyne, P. A., Olsen, M. J., Kim, Y. S., Rothacker, J., Nice, E. C., Walker, F., Ritter, G., Jungbluth, A. J., Old, et al
  2004; 279 (29): 30375-30384

- **Domain-level antibody epitope mapping through yeast surface display of epidermal growth factor receptor fragments** *JOURNAL OF IMMUNOLOGICAL METHODS*
  Cochran, J. R., Kim, Y. S., Olsen, M. J., Bhandari, R., Wittrup, K. D.
  2004; 287 (1-2): 147-158

- **Flow-cytometric isolation of human antibodies from a nonimmune Saccharomyces cerevisiae surface display library** *NATURE BIOTECHNOLOGY*
  Feldhaus, M. J., Siegel, R. W., Opresko, L. K., Coleman, J. R., Feldhaus, J. M., Yeung, Y. A., Cochran, J. R., Heinzelman, P., Colby, D., Swers, J., Graff, C., Wiley, H. S., Wittrup, et al
  2003; 21 (2): 163-170

- **Soluble peptide-MHC monomers cause activation of CD8+T cells through transfer of the peptide to T cell MHC molecules** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA*
  Ge, Q., Stone, J. D., Thompson, M. T., Cochran, J. R., Rushe, M., Eisen, H. N., Chen, J. Z., Stern, L. J.
  2002; 99 (21): 13729-13734

- **T-cell activation by soluble MHC oligomers can be described by a two-parameter binding model** *BIOPHYSICAL JOURNAL*
  Stone, J. D., Cochran, J. R., Stern, L. J.
  2001; 81 (5): 2547-2557

- **TCR: losing its inhibitions?** *TRENDS IN IMMUNOLOGY*
  Cameron, T. O., Stone, J. D., Cochran, J. R., Stern, L. J.
  2001; 22 (9): 479-480

- **Receptor proximity, not intermolecular orientation, is critical for triggering T-cell activation** *JOURNAL OF BIOLOGICAL CHEMISTRY*
  Cochran, J. R., Cameron, T. O., Stone, J. D., Lubetsky, J. B., Stern, L. J.
  2001; 276 (30): 28068-28074
- **Receptor clustering and transmembrane signaling in T cells** *TRENDS IN BIOCHEMICAL SCIENCES*
  Cochran, J. R., Aivazian, D., Cameron, T. O., Stern, L. J.
  2001; 26 (5): 304-310
- **Cutting edge: Detection of antigen-specific CD4(+) T cells by HLA-DR1 oligomers is dependent on the T cell activation state** *JOURNAL OF IMMUNOLOGY*
  Cameron, T. O., Cochran, J. R., Yassine-Diab, B., Sekaly, R. P., Stern, L. J.
  2001; 166 (2): 741-745
- **A diverse set of oligomeric class II MHC-peptide complexes for probing T-cell receptor interactions** *CHEMISTRY & BIOLOGY*
  Cochran, J. R., Stern, L. J.
  2000; 7 (9): 683-696
- **The relationship of MHC-peptide binding and T cell activation probed using chemically defined MHC class II oligomers** *IMMUNITY*
  Cochran, J. R., Cameron, T. O., Stern, L. J.
  2000; 12 (3): 241-250