

Stanford



Jeffrey J. Wine

Benjamin Scott Crocker Professor of Human Biology, Emeritus
Psychology

CONTACT INFORMATION

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Bio

BIO

I began my career as a neuroscientist studying how neural circuits produce behavior, but changed interests in mid-career to study cystic fibrosis (CF), with the goal of ameliorating the symptoms in people who have CF. I direct the Cystic Fibrosis Research Laboratory at Stanford. We discovered that a specific kind of sweating is rate-limited by CFTR--the anion channel product of the CF gene. We demonstrated that airway glands, which produce antibiotic-rich mucus that helps protect the airways, display a profound secretory defect in cystic fibrosis. Current research uses sweat secretion as a sensitive assay of CFTR function that can be used to assess the efficacy of drugs that improve CFTR function. We also study airway mucociliary clearance, and promote a preventative approach to lung infections in people with CF.

ACADEMIC APPOINTMENTS

- Emeritus Faculty, Acad Council, Psychology
- Member, Cardiovascular Institute
- Member, Maternal & Child Health Research Institute (MCHRI)
- Member, Wu Tsai Neurosciences Institute

ADMINISTRATIVE APPOINTMENTS

- Director, Program in Human Biology, Stanford, (2003-2006)

PROFESSIONAL EDUCATION

- Ph.D., UCLA , Physiological Psychology (1971)

LINKS

- Cystic Fibrosis Research Laboratory: <https://web.stanford.edu/group/CFRL/>
- Personal website: <http://web.stanford.edu/~wine/>

Research & Scholarship

CURRENT RESEARCH AND SCHOLARLY INTERESTS

The goal is to understand how a defective ion channel leads to the human genetic disease cystic fibrosis. Studies of ion channels and ion transport involved in gland fluid transport. Methods include SSCP mutation detection and DNA sequencing, protein analysis, patch-clamp recording, ion-selective microelectrodes, electrophysiological analyses of transmembrane ion flows, isotopic metho

CLINICAL TRIALS

- (Study: Vertex IIS) Does Ivacaftor Alter Wild Type CFTR-Open Probability In The Sweat Gland Secretory Coil?, Not Recruiting

Teaching

COURSES

2020-21

- Advanced Research: PSYCH 197 (Aut)
- Cellular Neuroscience: Cell Signaling and Behavior: PSYCH 120 (Aut)
- Ion Transport and Intracellular Messengers: PSYCH 121, PSYCH 228 (Spr)
- Senior Honors Research: PSYCH 198 (Win, Spr)

2019-20

- Advanced Research: PSYCH 197 (Aut)
- Ion Transport and Intracellular Messengers: PSYCH 121, PSYCH 228 (Spr)
- Senior Honors Research: PSYCH 198 (Win, Spr)

2018-19

- Advanced Research: PSYCH 197 (Aut)
- Cellular Neuroscience: Cell Signaling and Behavior: BIO 153, PSYCH 120 (Aut)
- Ion Transport and Intracellular Messengers: PSYCH 121, PSYCH 228 (Spr)
- Senior Honors Research: PSYCH 198 (Win, Spr)

Publications

PUBLICATIONS

- **Combined agonists act synergistically to increase mucociliary clearance in a cystic fibrosis airway model.** *Scientific reports*
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- **EARLY CONTINUOUS ANTI-INFECTIVES: CONCEPTS AND CONCERNS**
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- **High-Efficiency, Selection-free Gene Repair in Airway Stem Cells from Cystic Fibrosis Patients Rescues CFTR Function in Differentiated Epithelia.** *Cell stem cell*
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2019
- **How to live a long and healthy life with cystic fibrosis: Lessons from the CF ferret.** *Journal of cystic fibrosis : official journal of the European Cystic Fibrosis Society*
Wine, J. J.

2018

- **Ivacaftor restores CFTR-dependent sweat gland fluid secretion in cystic fibrosis subjects with S945L alleles** *JOURNAL OF CYSTIC FIBROSIS*
Kim, J., Davies, Z., Dunn, C., Wine, J. J., Milla, C.
2018; 17 (2): 179–85
- **The magnitude of ivacaftor effects on fluid secretion via R117H-CFTR channels: Human in vivo measurements** *PLOS ONE*
Char, J. E., Dunn, C., Davies, Z., Milla, C., Moss, R. B., Wine, J. J.
2017; 12 (4)
- **Marked increases in mucociliary clearance produced by synergistic secretory agonists or inhibition of the epithelial sodium channel** *SCIENTIFIC REPORTS*
Joo, N. S., Jeong, J. H., Cho, H., Wine, J. J.
2016; 6
- **Inhibition of airway surface fluid absorption by cholinergic stimulation.** *Scientific reports*
Joo, N. S., Krouse, M. E., Choi, J. Y., Cho, H., Wine, J. J.
2016; 6: 20735-?
- **Airway Gland Structure and Function.** *Physiological reviews*
Widdicombe, J. H., Wine, J. J.
2015; 95 (4): 1241-1319
- **Mucociliary clearance and submucosal gland secretion in the ex vivo ferret trachea.** *American journal of physiology. Lung cellular and molecular physiology*
Jeong, J. H., Joo, N. S., Hwang, P. H., Wine, J. J.
2014; 307 (1): L83-93
- **A Little CFTR Goes a Long Way: CFTR-Dependent Sweat Secretion from G551D and R117H-5T Cystic Fibrosis Subjects Taking Ivacaftor** *PLOS ONE*
Char, J. E., Wolfe, M. H., Cho, H., Park, I., Jeong, J. H., Frisbee, E., Dunn, C., Davies, Z., Milla, C., Moss, R. B., Thomas, E. A., Wine, J. J.
2014; 9 (2)
- **In vivo readout of CFTR function: ratiometric measurement of CFTR-dependent secretion by individual, identifiable human sweat glands.** *PloS one*
Wine, J. J., Char, J. E., Chen, J., Cho, H., Dunn, C., Frisbee, E., Joo, N. S., Milla, C., Modlin, S. E., Park, I., Thomas, E. A., Tran, K. V., Verma, et al
2013; 8 (10)
- **Substance P stimulates human airway submucosal gland secretion mainly via a CFTR-dependent process** *JOURNAL OF CLINICAL INVESTIGATION*
Choi, J. Y., Khansaheb, M., Joo, N. S., Krouse, M. E., Robbins, R. C., Weill, D., Wine, J. J.
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- **Synergistic airway gland mucus secretion in response to vasoactive intestinal peptide and carbachol is lost in cystic fibrosis** *JOURNAL OF CLINICAL INVESTIGATION*
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2007; 117 (10): 3118-3127
- **DURATIONS OF UNITARY SYNAPTIC POTENTIALS HELP TIME A BEHAVIORAL SEQUENCE** *SCIENCE*
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1978; 199 (4328): 557-559
- **ORGANIZATION OF ESCAPE BEHAVIOR IN CRAYFISH** *JOURNAL OF EXPERIMENTAL BIOLOGY*
Wine, J. J., Krasne, F. B.
1972; 56 (1): 1-?
- **Targeted replacement of full-length CFTR in human airway stem cells by CRISPR/Cas9 for pan-mutation correction in the endogenous locus.** *Molecular therapy : the journal of the American Society of Gene Therapy*
Vaidyanathan, S. n., Baik, R. n., Chen, L. n., Bravo, D. T., Suarez, C. J., Abazari, S. M., Salahudeen, A. A., Dudek, A. M., Teran, C. A., Davis, T. H., Lee, C. M., Bao, G. n., Randell, et al
2021
- **Granule-stored MUC5B mucins are packed by the non-covalent formation of N-terminal head-to-head tetramers** *JOURNAL OF BIOLOGICAL CHEMISTRY*

- Trillo-Muyo, S., Nilsson, H. E., Recktenwald, C. V., Ermund, A., Ridley, C., Meiss, L. N., Baehr, A., Klymiuk, N., Wine, J. J., Koeck, P. B., Thornton, D. J., Hebert, H., Hansson, et al
2018; 293 (15): 5746–54
- **Progress in understanding mucus abnormalities in cystic fibrosis airways.** *Journal of cystic fibrosis : official journal of the European Cystic Fibrosis Society*
Wine, J. J., Hansson, G. C., Konig, P., Joo, N. S., Ermund, A., Pieper, M.
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 - **Sweat rate analysis of ivacaftor potentiation of CFTR in non-CF adults.** *Scientific reports*
Kim, J. n., Farahmand, M. n., Dunn, C. n., Milla, C. E., Horii, R. I., Thomas, E. A., Moss, R. B., Wine, J. J.
2018; 8 (1): 16233
 - **The normal trachea is cleaned by MUC5B mucin bundles from the submucosal glands coated with the MUC5AC mucin** *BIOCHEMICAL AND BIOPHYSICAL RESEARCH COMMUNICATIONS*
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Sellers, Z. M., Illek, B. n., Figueira, M. F., Hari, G. n., Joo, N. S., Sibley, E. n., Souza-Menezes, J. n., Morales, M. M., Fischer, H. n., Wine, J. J.
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 - **Glandular Proteome Identifies Antiprotease Cystatin C as a Critical Modulator of Airway Hydration and Clearance** *AMERICAN JOURNAL OF RESPIRATORY CELL AND MOLECULAR BIOLOGY*
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Jeong, J. H., Hwang, P. H., Cho, D., Joo, N. S., Wine, J. J.
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 - **Proteomic Analysis of Pure Human Airway Gland Mucus Reveals a Large Component of Protective Proteins** *PLOS ONE*
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Wine, J. J.
2014; 345 (6198): 730–31
 - **Measuring mucociliary transport and mucus properties in multiple regions of airway epithelial surfaces helps clarify cystic fibrosis defects.** *American journal of respiratory and critical care medicine*
Wine, J. J.
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- **In Vivo Readout of CFTR Function: Ratiometric Measurement of CFTR-Dependent Secretion by Individual, Identifiable Human Sweat Glands** *PLOS ONE*
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- **CHOLINERGIC POTENTIATION OF CFTR-DEPENDENT SECRETION BY INDIVIDUAL, IDENTIFIABLE SWEAT GLANDS**
Wine, J., Chen, J., Modlin, S., Tran, K., Kennedy, M. H., Verma, R., Joo, N., Frisbee, E., THOMAS, E. A., Cho, H.
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- **Properties of substance P-stimulated mucus secretion from porcine tracheal submucosal glands** *AMERICAN JOURNAL OF PHYSIOLOGY-LUNG CELLULAR AND MOLECULAR PHYSIOLOGY*
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Wine, J. J.
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Joo, N. S., Wine, J. J., Cuthbert, A. W.
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- **MUCUS SECRETION FROM INDIVIDUAL FERRET SUBMUCOSAL GLANDS**
Cho, H., Joo, N., Wu, J., Krouse, M. E., Wine, J. J.
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- **MUCUS HYPOSECRETION FROM SUBMUCOSAL GLANDS FROM NASAL TURBINATE OF CF PIGLETS**
Cho, H., Joo, N., Khansaheb, M., Karp, P. H., Stoltz, D. A., Meyerholz, D. K., Welsh, M. J., Wine, J. J.
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- **HYPOSECRETION OF MUCUS FROM AIRWAY SUBMUCOSAL GLANDS OF CF PIGLETS**
Joo, N., Cho, H., Khansaheb, M., Karp, P. H., Stoltz, D. A., Meyerholz, D. K., Welsh, M. J., Wine, J. J.
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Wine, J. J.
2007; 133 (1): 35-54
- **Mucus secretion by single tracheal submucosal glands from normal and cystic fibrosis transmembrane conductance regulator knockout mice** *JOURNAL OF PHYSIOLOGY-LONDON*
Ianowski, J. P., Choi, J. Y., Wine, J. J., Hanrahan, J. W.
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Joo, N., Krouse, M. E., Choi, J., Wine, J. J.
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- **Optical method for quantifying rates of mucus secretion from single submucosal glands** *AMERICAN JOURNAL OF PHYSIOLOGY-LUNG CELLULAR AND MOLECULAR PHYSIOLOGY*
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