

CURRICULUM VITAE

ROBERT ALAN SANDHAUS, M.D., Ph.D., F.C.C.P.

Professor of Medicine
Director, Alpha₁-Antitrypsin Deficiency Program
National Jewish Health
1400 Jackson Street, Rm G106
Denver, CO 80206
(303) 270-2051

Medical Director, Alpha-1 Foundation
Suite 302
Executive Vice President and Medical Director, AlphaNet, Inc.
Suite 305
2937 SW 27th Avenue
Miami, FL 33133
(888) 825-7421 ext. 226

PERSONAL INFORMATION

Date of Birth: January 22, 1949
Place of Birth: Cleveland, Ohio
Email: rasandhaus@alphaone.org
ACLS Certification: Active
Colorado Lic. No.: 23793
Florida Lic. No.: ME 81607

EDUCATION

George W. Hewlett High School, New York		1964-1967
Haverford College, Pennsylvania	B.A.	1967-1971
Molecular Biology		
Stony Brook University, New York	M.D.	1971-1976
Stony Brook University, New York	Ph.D.	1971-1976
Experimental Pathology/Cell Biology		
Beth Israel Hospital, Boston, Massachusetts		1976-1978
Resident in Medicine		
University of California, San Francisco		1978-1980
Pulmonary Fellow		

ACADEMIC APPOINTMENTS

Harvard Medical School		1976-1978
Clinical Fellow in Medicine		
Cardiovascular Research Institute, U.C.S.F.		1978-1980
Research Fellow		

Laboratory of Radiobiology, U.C.S.F. Research Associate	1980-1981
University of California, San Francisco Instructor in Residence Department of Medicine	1980-1981
University of Colorado, School of Medicine Assistant Professor of Medicine	1981-1987
University of Colorado, School of Medicine and National Jewish Health Clinical Professor of Medicine	1996-2003
National Jewish Health Professor of Medicine	2003-Present

CLINICAL APPOINTMENTS

Medical Resident, Beth Israel Hospital	1976-1978
Pulmonary Fellow, U.C., San Francisco	1978-1980
Staff Physician, U.C., San Francisco	1980-1981
Senior Staff Physician, National Jewish Health	1981-1987
Consulting Physician, National Jewish Health	1987-1996
Staff Physician, Swedish Medical Center	1986-Present
Staff Physician, Porter Memorial Hospital	1986-Present
Staff Physician, Craig Hospital	1987-Present
Staff Physician, Littleton Hospital	1989-Present
Staff Physician, Vencor Hospital	1990-1995
Medical Director of Intensive Care Unit Littleton Hospital	1989-1994
Medical Director of Cardiopulmonary Department Littleton Hospital	1990-1994
Medical Director of Cardiopulmonary Department Porter Memorial Hospital	1992-1994
Director of Continuing Medical Education Porter Memorial Hospital	1992-1994
Medical Executive Committee Porter Memorial Hospital	1992-1994
Lung Transplant Committee University of Colorado Medical Center	1992-1996
Director, Alpha ₁ -Antitrypsin Deficiency Program National Jewish Health	1996-Present
Co-director, Center for Genetic Lung Disease University of Colorado Health Science Center	2000-2003

INDUSTRY AND NOT-FOR-PROFIT APPOINTMENTS

Senior Associate Director of Clinical Development Cortech, Inc.	1994-1995
--	-----------

Director of Clinical Development and Drug Safety Cortech, Inc.	1995-1996
Director/Vice President, Medical Affairs NeXstar Pharmaceuticals	1996-1999
Director, Clinical Research Gilead Sciences	1999-2000
Medical Director Alpha-1 Foundation	2000-Present
Executive Vice President and Medical Director AlphaNet, Inc.	2000-Present

SOCIETIES

American College of Chest Physicians, Fellow
 American Thoracic Society/American Lung Association, member
 American College of Physicians, member
 Colorado Medical Society
 Florida Medical Society

BOARD CERTIFICATION

Diplomate, American Board of Internal Medicine	1979
Subspecialty certification, Pulmonary Disease	1980
Subspecialty certification, Critical Care Medicine	1987 & 1998

HONORS, FELLOWSHIPS, AND GRANTS

Alpha Omega Alpha, Medical Honor Society	
Haverford College: Founders Club; Chairman, Honor Council	
Investigator, Arthritis Foundation, New York Chapter	1971-1973
Medical Scientist Fellowship National Institutes of Health	1973-1976
American College of Pathology-Sheard Sanford- Bausch & Lomb Award for meritorious research	1975
Fellowship, American Thoracic Society/ American Lung Association	1978-1980
Clinical Investigator Award Grant NHLBI, National Institutes of Health	1980-1985
Medical Advisory Board NMC Homecare	1991-1994
Board of Directors, Alpha-1 Association	1992-1997
Board of Directors, Alpha-1 Foundation	1995-2000
Board of Directors, AlphaNet	1997-Present
Board of Directors, Osteogenesis Imperfecta Foundation	2005-Present

Board of Directors, Association for the Accreditation of Human Research Protection Programs 2008-present

TEACHING EXPERIENCE

Special topic lectures, General Pathology, School of Medicine, SUNY at Stony Brook	1975-1976
Clinical instruction of Harvard medical students	1976-1978
Clinical instruction of UCSF medical students	1978-1980
Attending Physician, Respiratory Intensive Care Unit, San Francisco General Hospital	1980
Attending Physician, Family Medicine Residency Program Swedish Medical Center	1994
Attending Physician; National Jewish, Denver General, and University Hospitals, Denver, CO	1981-1987 & 1996-2000

INVITED LECTURES

Numerous talks at scientific meetings and invited lecturer throughout the country on topics including Alpha₁-Antitrypsin Deficiency; Management of the Patient Requiring Intensive Care; Interpretation of Pulmonary Function Testing, Arterial Blood Gases and Oximetry; Performance of Clinical Trials; ; Alpha-1 and COPD disease management; and Medical Computing.

PUBLICATIONS

1. Rosenberg, R., Sandhaus, R., and Janoff, A.: Further studies of human alveolar macrophage alanine-p-nitrophenyl esterase, *Am Rev Respir Dis* **106**: 114-115 (1972).
2. Janoff, A., Sandhaus, R.A., Hospelhorn, V.D., and Rosenberg, R.: Digestion of lung proteins by human leukocyte granules *in vitro*, *Proc Soc Exper Bio Med* **140**: 516-519 (1972).
3. Sandhaus, R.A. and Janoff, A.: Degradation of human alpha 1-antitrypsin by hepatocyte acid cathepsins: possible role in clinical alpha 1-antitrypsin deficiency, *Am Rev Respir Dis* **110**: 263-272 (1974).
4. Janoff, A., Sloan, B., Weinbaum, G., Damiano, V., Sandhaus, R.A., Elias, J., and Kimbel, P.: Experimental emphysema induced with purified human neutrophil elastase: tissue localization of the instilled protease, *Am Rev Respir Dis* **115**: 461-478 (1977).
5. Werb, Z., Banda, M.J., McKerrow, J.H., and Sandhaus, R.A.: Elastases and elastin degradation, *J Invest Derm* **79**: 154-159s (1982).
6. Sandhaus, R.A. and Janoff, A.: Elastase-induced emphysema: retention of instilled protease in the rat, *Am Rev Respir Dis* **126**: 914-920 (1982).
7. Sandhaus, R.A., MacCarthy, K., Musson, R., and Henson, P.: Elastolytic proteinases of the human macrophage, *Chest* **83s**: 60-62 (1983).
8. Downey, G.P., Sandhaus, R.A., Irvin, C.G.: From wheezes to lymphocytes via the esophageal balloon, *Respir Care* **30**: 52-55 (1985).
9. Sandhaus, R.A.: Modems and the M.D. The microcomputer as a communications tool (editorial), *Chest* **87**: 4-5 (1985).
10. Sandhaus, R.A.: Genetic basis of chronic obstructive pulmonary disease, *Seminars in Respiratory Medicine* **7**: 353-357 (1986).
11. Smedley, L.A., Tonnesen, M.G., Sandhaus, R.A., Haslett, C., Guthrie, L.A., Johnston, R.B., Jr., Henson, P.M., and Worthen, G.S.: Neutrophil-mediated injury to endothelial cells. Enhancement by endotoxin and essential role of neutrophil elastase, *J Clin Invest* **77**: 1233-1243 (1986).
12. Sugahara, K., Cott, G.R., Parsons, P.E., Mason, R.J., Sandhaus, R.A., and Henson, P.M.: Epithelial permeability produced by phagocytosing neutrophils in vitro, *Am Rev Respir Dis* **133**: 875-881 (1986).

13. Sandhaus, R.A.: Elastase may play a central role in the migration of neutrophils through connective tissue, in: Second International Symposium on Pulmonary Emphysema and Proteolysis, Charles Mittman (ed.), Academic Press, New York (1986).
14. Beard, B.R., Cheronis, J.C., Sandhaus, R.A., Berger, E.M., White, C.W., and Repine, J.E.: O₂ metabolites and neutrophil elastase synergistically cause edematous injury in isolated rat lungs, *J Appl Physiol* **61**: 2224-2229 (1986).
15. Fittschen, C., Sandhaus, R.S., Worthen, G.S., Henson, P.M.: Bacterial lipopolysaccharide enhances chemoattractant-induced elastase secretion by human neutrophils, *J Leukoc Biol* **43**:547-556 (1988).
16. Sandhaus, R.A.: The New England Journal of Medicine: CD Product Review, CD-ROM World **8**:74-76 (1993).
17. Survival and FEV₁ decline in individuals with severe deficiency of alpha₁-antitrypsin. The Alpha-1-Antitrypsin Deficiency Registry Study Group, *Am J Respir Crit Care Med* **158**:49-59 (1998).
18. Mayer, A.S., Stoller, J.K., Bucher Bartelson, B., Ruttenber, A.J., Sandhaus, R.A., Newman, L.S.: Occupational exposure risks in individuals with PI*Z alpha₁-antitrypsin deficiency, *Am J Respir Crit Care Med* **162**:553-588 (2000).
19. Sandhaus, R.A.: Alpha₁-antitrypsin deficiency therapy: pieces of the puzzle, *Chest* **119**:676-678 (2001).
20. Stoller, J.K., Fallat, R., Schluchter, M.D., O'Brien, R.G., Connor, J.T., Gross, N., O'Neil, K., Sandhaus, R.A., Crystal, R.G.: Augmentation therapy with alpha₁-antitrypsin: patterns of use and adverse events, *Chest* **123**:1425-34 (2003).
21. Sharp, R.R., de Serres, F., Newman, L., Sandhaus, R.A., Walsh, J.W., Hood, E., Harry, G.J.: Environmental, occupational, and genetic risk factors for α -1 antitrypsin deficiency, *Environ Health Perspect* **114**:1749-1752 (2003).
22. Sandhaus, R.A.: α 1-Antitrypsin deficiency -- 6: New and emerging treatments for α 1-antitrypsin deficiency, *Thorax* **59**:904-909 (2004).
23. Campos, M., Wanner, A., Sandhaus, R.A.: Trends in the Diagnosis of Symptomatic Patients with Alpha-1 Antitrypsin Deficiency between 1968 and 2003, *Chest* **128**:1179-1186 (2005).
24. Stoller, J.K., Sandhaus, R.A., Turino, G., Dickson, R., Rodgers, K., Strange, C.: Delay in diagnosis of α ₁-antitrypsin deficiency: a continuing problem, *Chest* **128**:1189-1194 (2005).

25. Strange, C., Stoller, J.K., Sandhaus, R.A., Dickson, R., Turino, G.: Results of a survey of patients with alpha-1 antitrypsin deficiency, *Respiration* **73**:185-190 (2006).
26. Stocks, J.M., Brantly, M., Pollock, D., Barker, A., Kueppers, F., Strange, C., Donohue, J.F., Sandhaus, R.: Multi-center study: The biochemical efficacy, safety and tolerability of a new α_1 -proteinase inhibitor, *Zemaira, J COPD* **3**:17-23 (2006).
27. Sandhaus, R. A.: Alpha-1 antitrypsin deficiency: doing the right thing (or start kissing those frogs). *J COPD* **3**:123-124 (2006).
28. Mayer, A.S., Stoller, J.K., Bucher Bartelson, B., Sandhaus, R.A., Newman, L.S.: Risk factors for symptom onset in PI*Z alpha-1 antitrypsin deficiency. *International J COPD* **1**:485-492 (2007).
29. DeMeo, D. L., Sandhaus, R. A., Barker, A.F., Brantly, M.L., Eden, E., McElvaney, N.G., Rennard, S., Burchard, E., Stocks, J.M., Stoller, J.K., Strange, C., Turino, G.M., Campbell, E.J., Silverman, E.K.: Determinants of airflow obstruction in severe alpha-1 antitrypsin deficiency. *Thorax* **62**:806-813 (2007).
30. DeMeo, D. L., Campbell, E.J., Barker, A.F., Brantly, M.L., Eden, E., McElvaney, N.G., Rennard, S., Sandhaus, R.A., Stocks, J.M., Stoller, J.K., Strange, C., Turino, G.M., Silverman, E.K.: IL10 polymorphisms are associated with airflow obstruction in severe alpha-1-antitrypsin deficiency. *Am J Respir Cell Mol Biol* **38**:114-20 (2008).
31. Campos, M.A., Alazemi, S., Zhang, G., Sandhaus, R.A., Wanner, A.: Influenza vaccination in subjects with α_1 -antitrypsin deficiency. *Chest* **133**:49-55 (2008).
32. Sandhaus, R.A., Turino, G., Stocks, J., Strange, C., Trapnell, B.C., Silverman, E.K., Everett, S.E., Stoller, J.K.: Alpha-1 antitrypsin augmentation therapy for PI*MZ heterozygotes: a cautionary note. *Chest* **134**:831-834 (2008).
33. Demeo, D.L., Campbell, E.J., Brantly, M.L., Barker, A.F., Eden, E., McElvaney, N.G., Rennard, S.I., Stocks, J.M., Stoller, J.K., Strange, C., Turino, G., Sandhaus, R.A., Silverman, E.K.: Heritability of lung function in severe alpha-1 antitrypsin deficiency. *Hum Hered* **67**:38-45 (2009).
34. Campos, M.A., Alazemi, S., Zhang, G., Wanner, A., Sandhaus, R.A.: Effects of a disease management program in individuals with alpha-1 antitrypsin deficiency. *J COPD*, **6**:31-40 (2009).
35. Campos, M.A., Alazemi, S., Zhang, G., Salathe, M., Wanner, A., Sandhaus, R.A., Baier, H.: Clinical characteristics of subjects with symptoms of α_1 -antitrypsin deficiency older than 60 years. *Chest*, **135**:600-608 (2009).

36. Campos, M.A., Alazemi, S., Zhang, G., Wanner, A., Salathe, M., Baier, H., Sandhaus, R. A.: Exacerbations in subjects with alpha-1 antitrypsin deficiency receiving augmentation therapy. *Respir Med* (2009).
37. Silverman, E.K., Sandhaus, R.A.: Clinical practice. Alpha1-antitrypsin deficiency. *N Engl J Med*, **360**:2749-2757 (2009).
38. Castaldi, P. J., Demeo, D.L. Kent, D.M., Campbell, E.J., Barker, A.F., Brantly, M.L., Eden, E., McElvaney, N.G., Rennard, S.I., Stocks, J.M. Stoller, J.K., Strange, C., Turino, G., Sandhaus, R.A., Griffith, J.L., Silverman, E.K.: Development of Predictive Models for Airflow Obstruction in Alpha-1-Antitrypsin Deficiency. *Am J Epidemiol.* 170:1005-1013 (2009).
39. Sandhaus, R. A.: Augmentation therapy in alpha-1 antitrypsin deficiency. *COPD* **6**:147-148 (2009).

DISSERTATION

Sandhaus, R.A.: Retention, localization, and fate of endotracheally administered protease in an animal model of pulmonary emphysema, Dissertation presented for the degree of Doctor of Philosophy, Department of Pathology, S.U.N.Y. at Stony Brook, New York (1976).

CHAPTERS

1. Janoff, A., Blondin, J., Sandhaus, R.A., Mosser, A., and Malemud, C.: Human neutrophil elastase: in vitro effects on natural substrates suggest important physiological and pathological actions, in: Proteases and Biological Control, E. Reich, D. Rifkin, and E. Shaw (eds.), Cold Spring Harbor Laboratory Press, Cold Spring Harbor, NY (1975) pp 603-620.
2. Sandhaus, R.A.: Newer agents, in: Drugs for the Respiratory System, R.M. Cherniack (ed.), Grune & Stratton, Inc., Orlando, FL (1986) pp 227-236.
3. Sandhaus, R.A.: Alpha₁-proteinase inhibitor deficiency, in: Current Therapy of Respiratory Disease -2, R.M. Cherniack (ed.), B.C. Decker, Inc, Philadelphia, PA (1986) pp 125-126.
4. Sandhaus, R.A.: Pulmonary medicine, in: Essentials of Internal Medicine in Clinical Podiatry, W.B. Saunders, Philadelphia, PA (1990).
5. Sandhaus, R.A.: Alpha₁-Antitrypsin Augmentation Therapy, in: Proteases, Protease Inhibitors and Protease-Derived Peptides, J.C. Cheronis and J.E. Repine (eds.), Birkhauser Verlag, Basel, Switzerland (1993) pp 97-102.

6. Fielding, R.M., Mukwaya, G., and Sandhaus, R.A.: Clinical and preclinical studies with low-clearance liposomal amikacin (MiKasome®), in: Long-Circulating Liposomes: Old Drugs, New Therapeutics, Woodle, M.D. and Storm, G (eds.), Landes Bioscience, Austin, TX (1998) pp 213-225.
7. Sandhaus, R.A.: α_1 -Antitrypsin Deficiency, in Pediatric Respiratory Medicine (Second Edition), Taussig, L.M. and Landau, L.I. (eds.), Mosby Elsevier, Philadelphia, PA (2008) pp 1015-1024.

BOOKS

1. Alpha-1 Disease Management and Prevention Program: The Big Fat Reference Guide to Alpha-1; Senior Editor and primary author: Robert A. Sandhaus. Multiple contributing authors. AlphaNet Press (2004).